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In This Issue—*Getting the Owner's Confidence*

FEB 19 1921

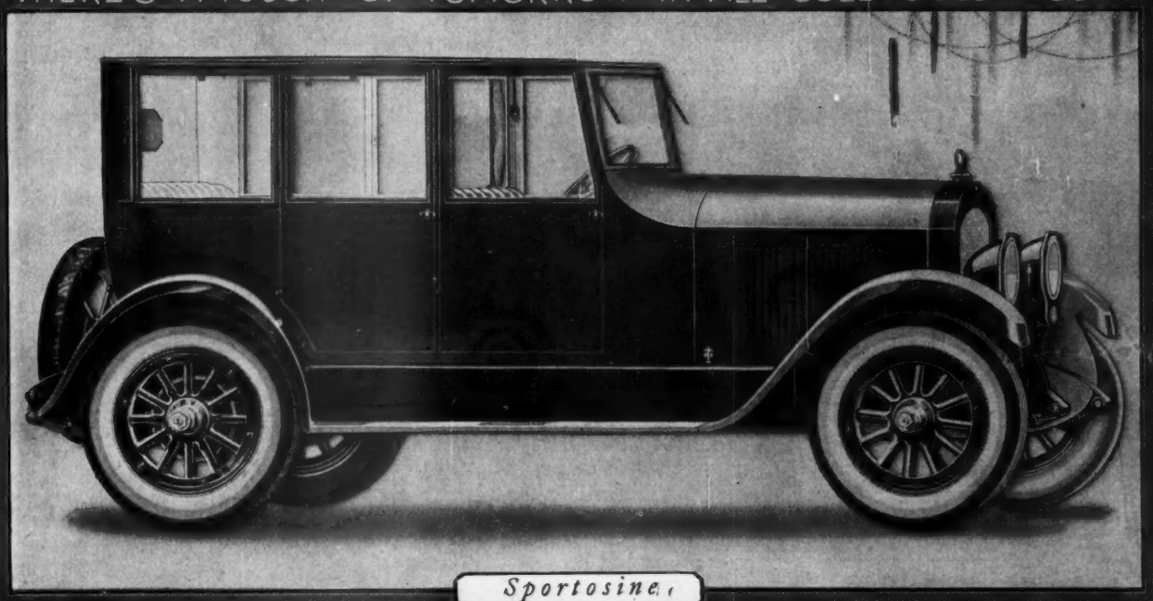
MOTOR AGE

Volume XXXIX
Number 7

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, FEBRUARY 17, 1921

Thirty-five Cents a Copy
Five Dollars a Year

THERE'S A TOUCH OF TOMORROW IN ALL COLE DOES TODAY



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Cole Aero-EIGHT

The beauty of the *Cole Aero*-EIGHT design is equalled only by the superb performance of the mechanism. Its 15,000 miles on tires bespeaks its unusual economical achievement.

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Creators of Advanced Motor Cars

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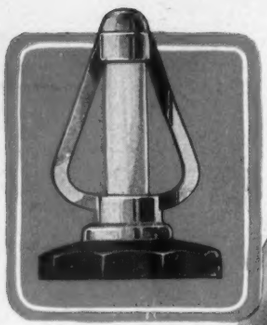
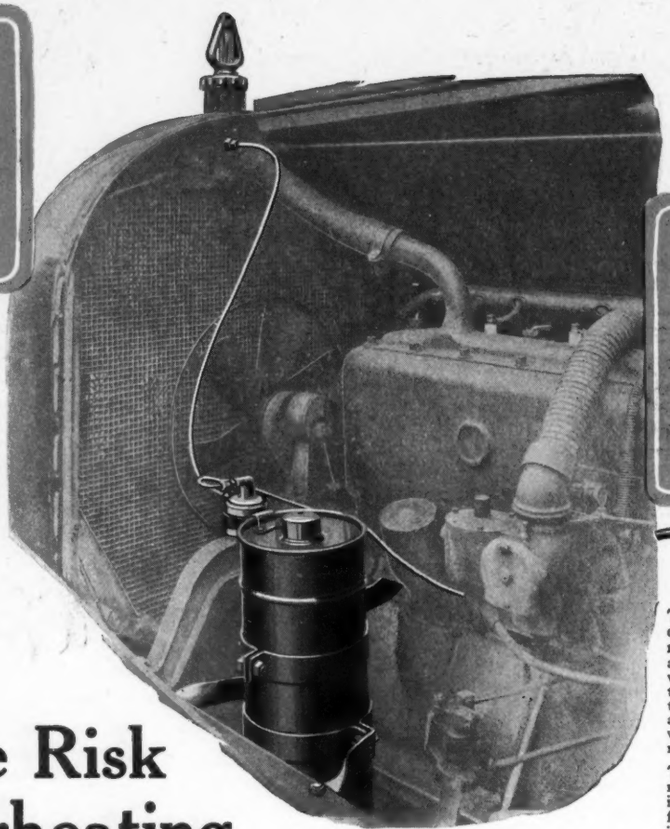


An ornamental radiator indicator keeps the driver informed as to what is taking place in the cooling system. It gives positive assurance by its bubbling that the system has anticipated an impending danger and has overcome it before "overheating" could take place.



Tank which holds reserve supply of water, collects, condenses and returns to circulation all vapor and overflow from expansion of water from the radiator. Practically no water is ever lost except through actual leaks. A whistle at top of the tank sounds a warning when the reserve supply needs replenishment.

The Re-flow valve automatically maintains the full level of water in the radiator. A very slight flow of vapor is constantly fed into the intake manifold.

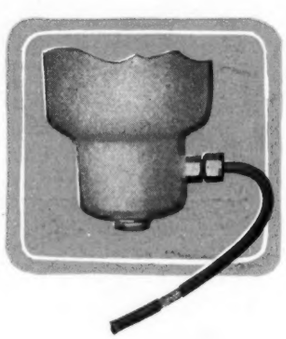
End the Risk of Overheating

SLOW, gradual overheating, at times perceptible but generally unseen, is the thief of motor efficiency that most owners have to guard against. Overheating begins when the cooling system fails to operate to full capacity. If the water supply in the radiator is depleted, even partially, it ceases to protect the motor and serious harm takes place. Protect your motor by equipping your car with the Weeks Re-flow System.

The Weeks Re-flow System prevents overheating by keeping the radiator full of water all the time under every operating condition. With the cooling system operating to full capacity, the motor is always at the most favorable point of operating efficiency.

Better service from present day fuels is observed, as well as a material decrease in the destruction and consumption of lubricating oil.

The re-flow System is easily installed on passenger cars, trucks and tractors now in use. Sold on 10 days' trial. Particulars on request. Dealers and distributors, write regarding territory franchises.

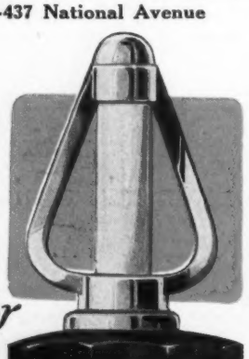


Connection is made into the intake manifold carrying into the motor a constant slight flow of vapor which humidifies the carburetion mixture to a safe degree, insuring an "evening mist" effect. Noticeable snap and power are given to the motor and carbon is practically eliminated.

WEEKS MANUFACTURING CO.

421-437 National Avenue Milwaukee, Wisconsin

"The Mark of the Cared-for Car"



The Weeks **Re-flow** *System*

MOTOR AGE

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Illustrating the structure of Flexedge Valves. As the valve head strikes the seat the edges of the laminations are flexed slightly and free the seat of carbon deposits. Thus the valve seats itself and always holds compression.

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Everybody profits from the sale of Flexedge Valves

Order from your jobber or from us.

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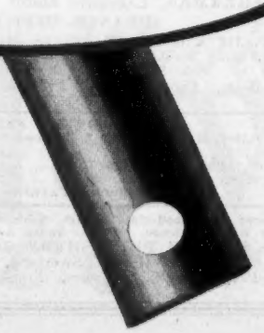


Flexedge

VALVES You Never Need Grind

Vol. XXXIX. No. 7. CHICAGO, FEBRUARY 17, 1921 $5.00 Per Year

MOTOR AGE

Getting the Owner's Confidence

It Is Not Enough to Have the Finest Service Station in the World If Your Customers Do Not Have Faith in Your Organization

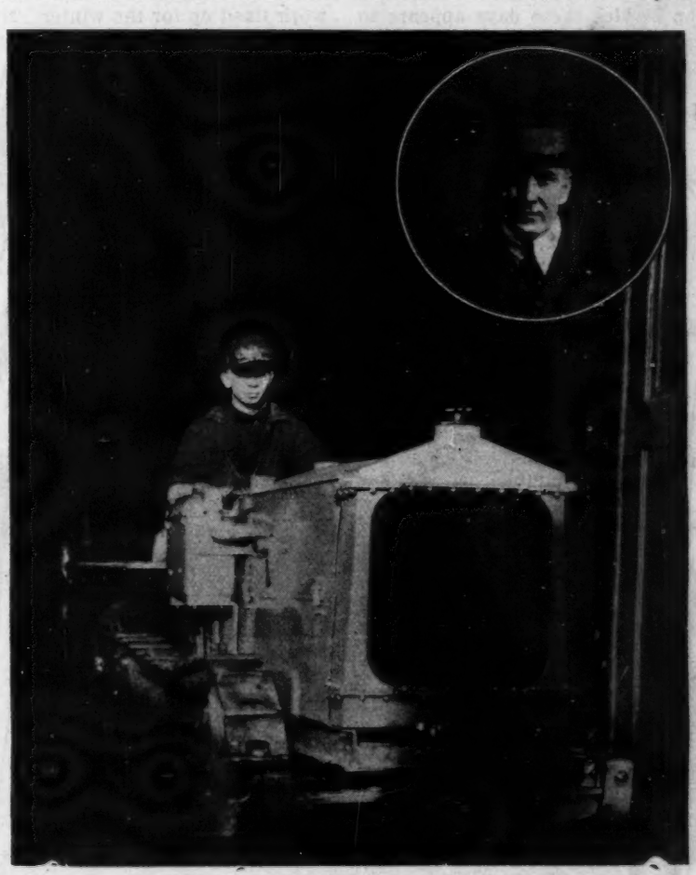
THERE is a concern in Minneapolis which has been making money this winter on its service when a good many motor car dealers all over the country have been sitting back in their chairs and complaining about no business.

It is true that car sales have not been what the dealers would have liked and a good many have gone along on pretty thin ice for the last six or seven months, but there are some dealers who have tided over thus far on the business they did the earlier part of last year and on their service work.

The Minneapolis Nash Co. has succeeded in keeping its service department busy this winter largely through the efforts of its service manager, B. S. Fuller. Not only has Mr. Fuller made money for the house all this time, but in keeping his men busy he is assured of having in the spring a staff of mechanics capable of handling the usual peak load at that time of the year. Keeping an organization intact is a real accomplishment these days, especially in the motor car industry.

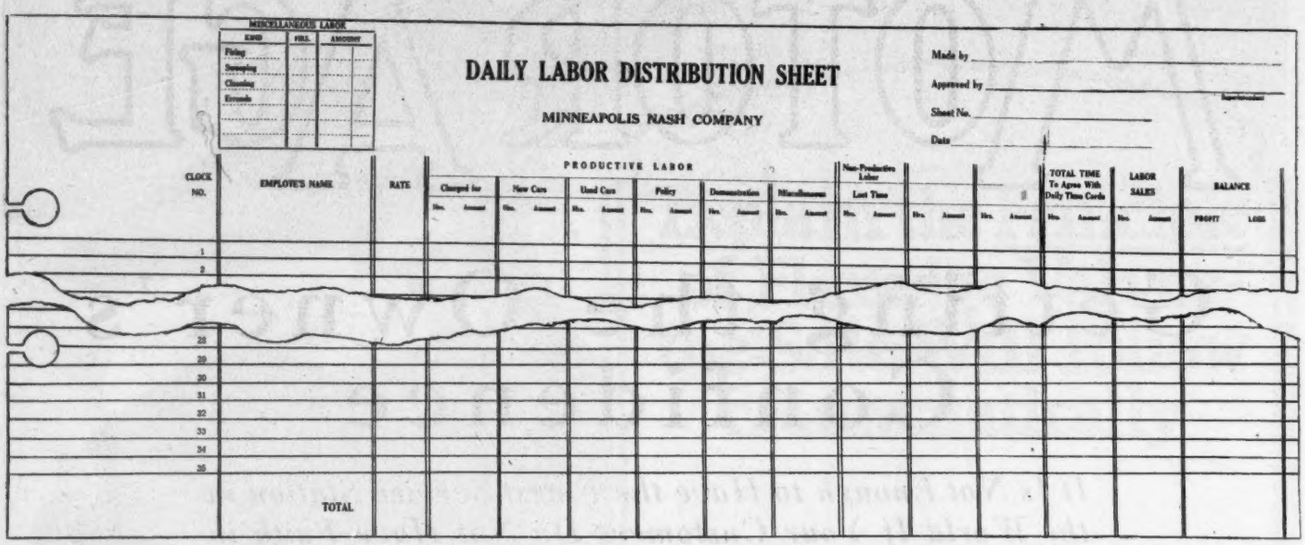
There is nothing extraordinary in the service methods used by Mr. Fuller. He has enough weight of years on his shoulders to know human nature and knows the psychological side of the service problem probably as well as any man in a similar position in the country. There is nothing elaborate about the system he uses in rendering service, but, his system works and it works so well that he can be gone for days at a time and the system functions just the same. He might be off on a fishing trip, and fishing trips and hunting trips are popular in this section of the country, and yet he is able to know from day to day exactly what his shop has been doing if he cares to have the daily records sent out to him.

Getting the confidence of car owners is the thing every service manager must do before he successfully can handle this phase of the dealer's business, states Mr. Fuller. It does not matter if one has the finest and most completely equipped shop or service station in the country, if the man at the helm has not the confidence of his customers they will soon



B. S. Fuller, service manager for the Minneapolis Nash Co., whose picture is shown in the circle, kept his organization together last fall and this winter by getting in outside work, although he has had plenty of motor car service work. Here also is shown one of the Cletrac tractors overhauled by Fuller's men

You Will Know Exactly Where You Stand With a Record Sheet Like This



MISCELLANEOUS LABOR

KIND	HRS.	AMOUNT
Piling		
Sweeping		
Cleaning		
Errands		

DAILY LABOR DISTRIBUTION SHEET

MINNEAPOLIS NASH COMPANY

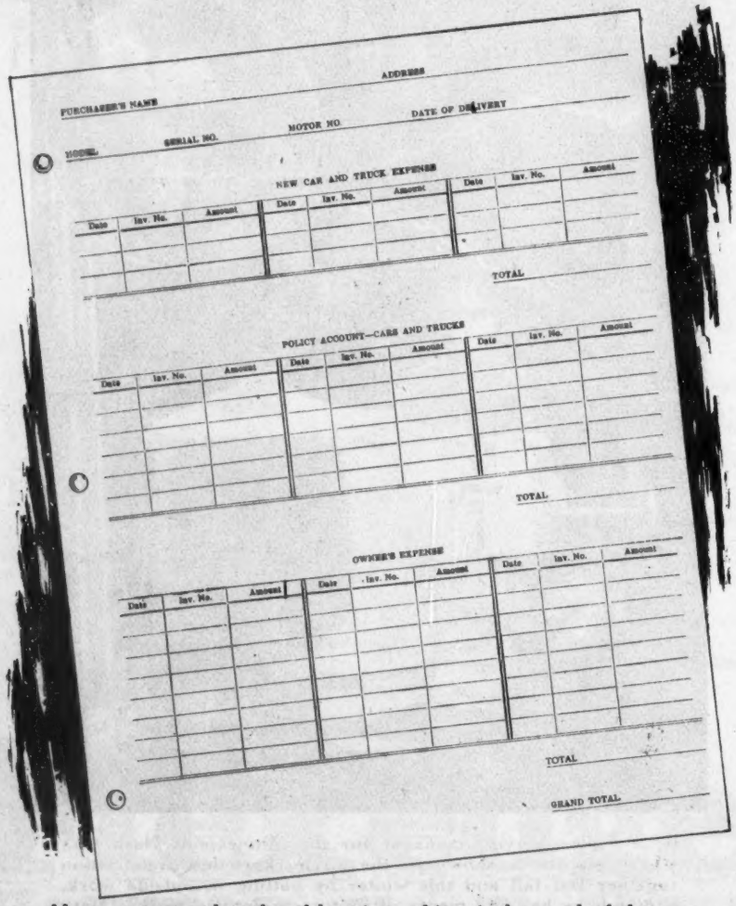
Made by _____
Approved by _____ Superintendent
Sheet No. _____
Date _____

CLOCK NO.	EMPLOYE'S NAME	RATE	PRODUCTIVE LABOR: Charged for (Hrs. / Amount)	New Cars (Hrs. / Amount)	Used Cars (Hrs. / Amount)	Policy (Hrs. / Amount)	Demonstration (Hrs. / Amount)	Miscellaneous (Hrs. / Amount)	Non-Productive Labor: Lost Time (Hrs. / Amount)	(Hrs. / Amount)	(Hrs. / Amount)	TOTAL TIME To Agree With Daily Time Cards (Hrs. / Amount)	LABOR SALES (Hrs. / Amount)	BALANCE (PROFIT / LOSS)
1														
2														
28														
29														
30														
31														
32														
33														
34														
35														
	TOTAL													

This is the record sheet which Mr. Fuller evolved for his organization to keep a check each day on what the shop has done. This sheet is made out from the mechanics' time cards and it is possible to tell exactly the number of hours of unproductive labor and what the labor was for. Every morning the previous day's record sheet is placed on the general manager's desk so that he can tell instantly what the service department is doing.

cease to be his customers or he will be losing money for the concern and losing money on service these days appears to be going out of fashion at a quick rate.

Along last fall our readers will remember that MOTOR AGE talked of getting work lined up for the winter. Mr. Fuller was among those service managers who realized the necessity of going out after business instead of waiting for it to come in. What did he do? Listen.



PURCHASER'S NAME _____ ADDRESS _____

MODEL _____ SERIAL NO. _____ MOTOR NO. _____ DATE OF DELIVERY _____

NEW CAR AND TRUCK EXPENSE

Date	Inv. No.	Amount	Date	Inv. No.	Amount	Date	Inv. No.	Amount

TOTAL _____

POLICY ACCOUNT—CARS AND TRUCKS

Date	Inv. No.	Amount	Date	Inv. No.	Amount	Date	Inv. No.	Amount

TOTAL _____

OWNER'S EXPENSE

Date	Inv. No.	Amount	Date	Inv. No.	Amount	Date	Inv. No.	Amount

TOTAL _____

GRAND TOTAL _____

Have you ever thought of keeping a historical record of the cars you sell and service? Above is the record sheet used by the Minneapolis Nash Co. It was originated also by Mr. Fuller

In the first place he analyzed his territory and found that there were a lot of tractors working in the Dakotas, Montana and Minnesota. He scouted among his own organization first and found that one of the truck salesmen formerly was connected with a tractor concern and knew all about that particular tractor. This salesman knew just how often the main bearings of the tractor should be looked after and just what ought to be done to the tractor after a season's work. Fuller immediately drew up a specification sheet which when filled out gave to the tractor owner a list of the things that would be done to his tractor and what the job would cost. After all was said and done the job of completely overhauling the tractor ran anywhere from $250 to $500, whereas a new tractor would cost the farmer about three times that amount.

Letters went out to tractor owners stating the plan to them and the result was that during the fall and winter tractors were shipped into the Minneapolis Nash Co. from points as far west as Montana. One of the last tractors to be overhauled is shown in the illustration. It has been gone over thoroughly and the owner is assured a job as good as a new machine. All the tractor overhaul work was done in the truck department of the Minneapolis Nash Co. because of the similarity of the work.

But tractor overhaul constituted only a small portion of the company's service work. This company has placed a good many Nash cars in this section of the country and Mr. Fuller feels that he is getting the service work on every one of these cars. In fact, he knows he is getting it because he has an accurate

way of checking this up. The important thing to know is that he is getting all the service work of these owners, and when a service manager can say that he deserves all the credit he can get.

The reason Mr. Fuller gets all the business from the owners of cars his concern sells is because he goes after it. He sold himself into the hearts of his customers and they abide by his judgment. He keeps his promises. We were in his service station when a man was promised his car at 6 o'clock. It was ready for him at 6 o'clock. This fall and winter Mr. Fuller called upon the business men of his town owning Nash cars and sold them on the fact that it would be to their advantage to have certain work done on their cars at this particular time. He has a historical record of every Nash car sold in this territory and knows exactly when a certain car should have its valves ground, main bearings taken up, etc.

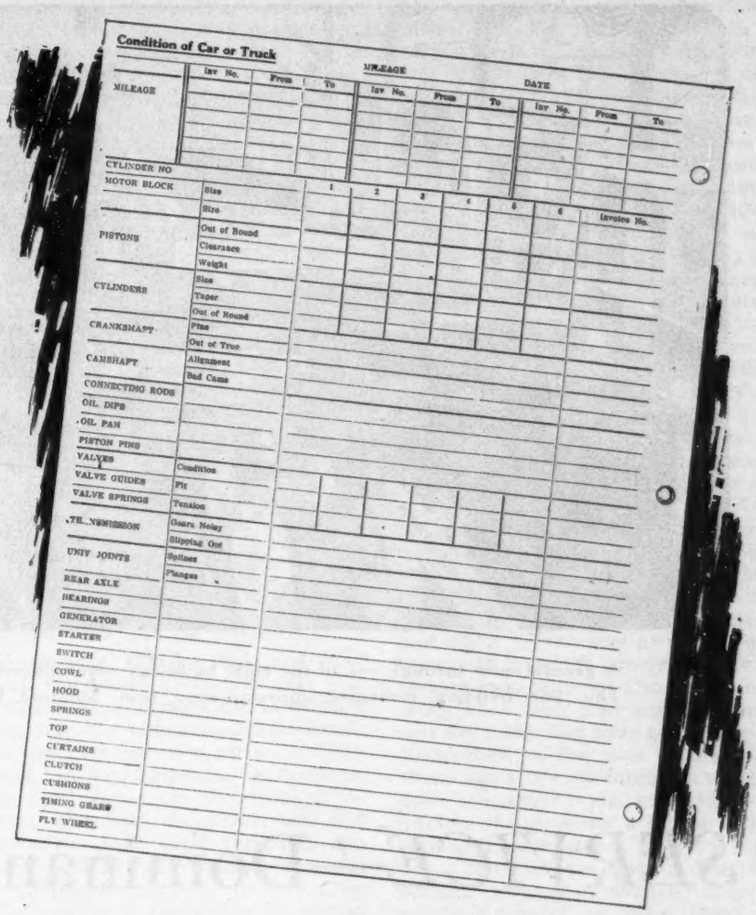
Know Costs Exactly

The general manager of the Minneapolis Nash Co. knows every morning exactly what the service department did the day before. He knows to a cent how much profit was made. This has been made possible by the daily labor distribution sheet which has been used by Mr. Fuller for some time. This sheet is of immense value in more ways than one. It is a check on the abilities of the men, shows the amount of time spent on productive labor, and non-productive labor, and in fact is a complete record of everything that goes on in the service station every minute of the working day. The time is made out from the time slips of the men. There is no guess about anything. The service manager can tell at any time the status of things. He does not have to take a thing for granted. He knows.

Then there is the car record which Mr. Fuller has evolved. This has been in use for a long time by him and he says it is the best thing any service manager can do if he wants to get service on the right basis. At the time a new Nash is sold a record sheet is started. The company knows to a cent how much it had to spend on the car and how much the owner has to spend on it. No owner can come in and say "This car was in here last year and I had the bearings taken up, etc.," unless that car really was in, because with the accurate checking system this is impossible. The mileage is put down among other things and it is only necessary to refer to the invoice number to see what was done to the car. This information is of great value when a used car is to be traded in for a new one. The company knows exactly what has been spent on the old car. In case a new car does not function properly a notation is made on the reverse side of the record sheet for the factory.

Once a month Mr. Fuller takes his men to dinner at which time they talk shop or anything else. Naturally this has had a far-reaching effect in that the men become better acquainted and some common problems are thrashed out for which time cannot always be found during working hours.

A Historical Record Helps the Factory Too



This is the other side of the record sheet shown on the preceding page. On this side notations are made in case a new car or truck misfunctions. It is sent to the factory and affords a ready means for checking up on the work

They Are Going After Business

DANVILLE, ILL., dealers are printing full page advertisements in the daily newspapers of that city, half devoted to a poster of an automobile and the other half reading like this:

Buy That Car Now

The only sure way to have that new car next spring is to but it NOW. You gain nothing by waiting—but you may lose much.

You remember less than a year ago it was almost impossible to get delivery on any car at any price.

Take Advantage of This Buyer's Market

Now you can get any car you choose. The 1921 models have arrived and are now on display. But if you hold off—and expect to buy in the spring you may not be able to get delivery, for automobile factories are only working to part capacity.

When spring buyers rush in it may take months before you can get your car.

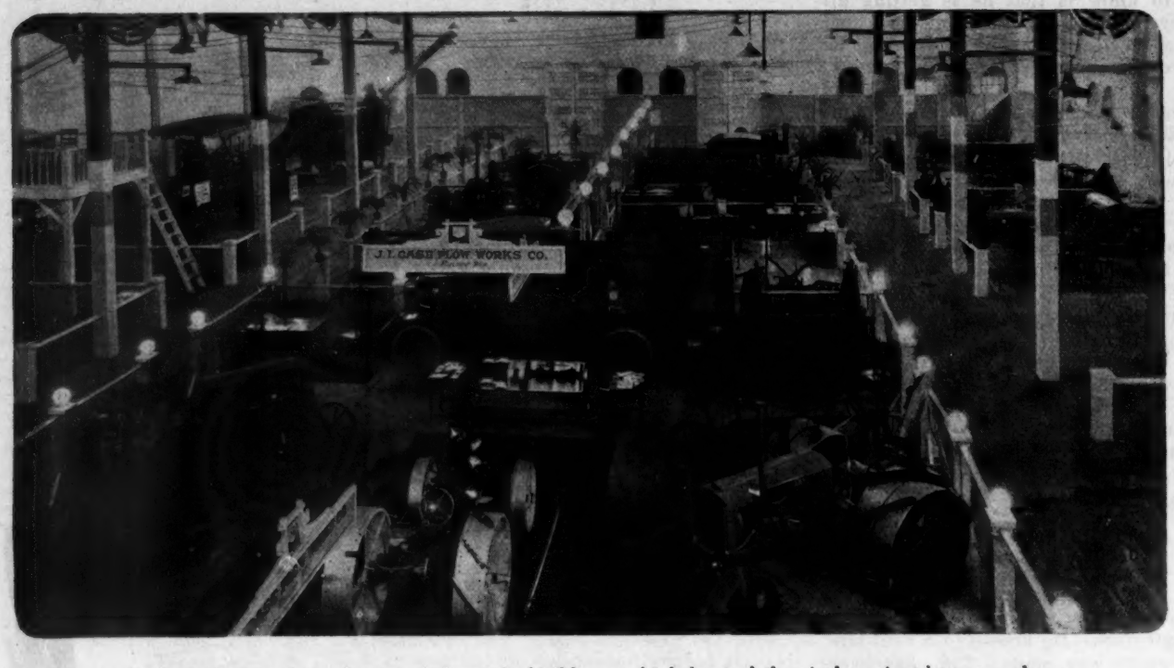
Don't Be Caught Napping

Get in ahead of the rush. Look back and you will see that conditions changed from a buyer's to a seller's market over night. The swing back may be just as quick.

Today is a buyer's market. Take quick advantage of it, or you may have to buy your car on a seller's market next spring.

Foresight Beats Hindsight

Enjoy that car now and be sure of having it next spring. If circumstances prevent you using it now, we will store it for you until March, free of charge.—But BUY THAT CAR NOW.



A general view through one of the eight buildings which housed the sixth national tractor show. This one building measures approximately four hundred by one hundred and fifty feet

SERVICE—Dominant Demand of National Tractor Show

Automotive Dealers Logically Qualified to Sell and Service Products of Tractor Industry

By DAVID BEECROFT

COLUMBUS, O., Feb. 12—No more important deduction can be arrived at after a week spent at the sixth national tractor show held here all of this week than that the question of servicing the tractor has gained enormously in importance and tractor distributors are generally agreed that it is more important to have a dealer who can give service as his major qualification than to have one that has a knowledge of the operation of farm machinery as his major qualification. They agree that it is not a difficult matter to teach a dealer the fundamentals in operation of farm machinery, but that it is a most difficult and in many cases an impossible job to teach a man the various problems of service.

More distributors have run into trouble in getting dealers who do not know how to give service than have run into trouble by having dealers that did not know how to make plows work properly or how to set disk harrows or other pieces of power farm equipment. One distributor who has the southern half of Ohio and has under him thirty-one dealers, will serve as a typical example of service trouble. One of the thirty-one dealers was a farmer to whom he gave a discount of 10 per cent for selling tractors, and two years ago he sold fourteen tractors in one season and took his commission. Those fourteen tractors have still to be looked after and the distributor finds himself today and has for the last year found himself required to service these tractors that are over one hundred miles from his place of business. The farmer never made any pretense to give service. He just wanted his 10 per cent commission on sales. He got it and then forgot the tractors.

THE experience of this tractor distributor can be multiplied a hundred times in the experience and information gained at the show. The dominant requirement of the tractor dealer is service. There are in Columbus this week scores of distributors who are looking for dealers who are qualified to give service and who have been giving service in selling motor cars and motor trucks for several years. These distributors are through with the small implement dealer who has a small shop in which he stores farm machinery and delivers a tractor when a farmer buys one from him, and after he calls on the distributor to look after all the trouble.

A Cletrac distributor who sells 90 per cent of his machines through motor car or automotive dealers declares that practically all of his dealers are making money and giving service. In the last year over 260 were sold in the State of Maine and an equal number in the remainder of New England, practically all being sold by motor car dealers, the dealer sometimes being a Cadillac, a Dodge, a Buick, a Studebaker or other line man. These dealers have gone out and sold tractors just as they have sold trucks and motor cars, and they have made money on every sale.

A Samson distributor with thirty-five dealers under him is using motor car dealers exclusively, many Chevrolet, Buick, Dodge and other lines of dealers. This distributor is looking only for motor car dealers, because they know the internal combustion engine and they know service. The Fordsons are almost exclusively sold by Ford dealers, and the motor car dealer is today a rapidly increasing factor in the sales of tractors; and further, the tractor manufacturer is looking to him more than ever before. Service is the key to the entire situation.

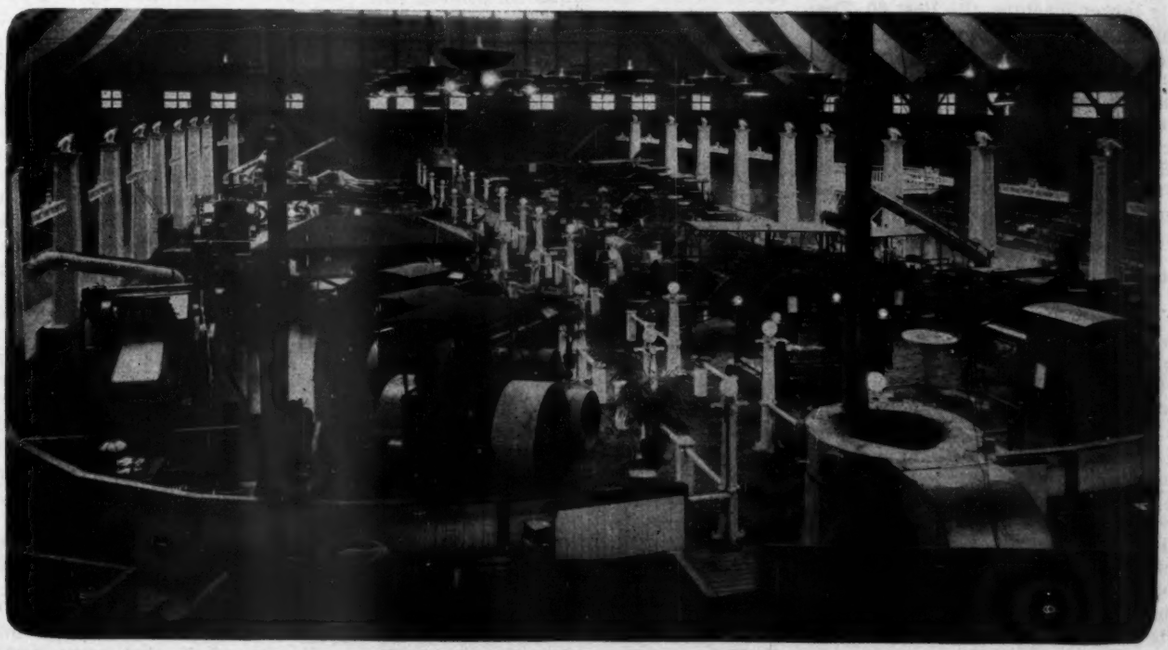
One dealer in a Michigan town sold 150 of one make last year and as a result he has given up the agency of one of our largest medium-priced car makes and is devoting himself exclusively to tractors. The used-car business has robbed him of so much profit that he sees a bigger future in the tractor. This week we have talked with half a dozen motor car dealers who have been handling good lines of cars and who have given up these lines to take on medium priced tractors, and the line of farm equipment that invariably goes with the tractor.

PROFITS FROM SELLING FARM EQUIPMENT BIG ITEM

The motor car dealer not in the tractor business should not overlook the money that comes from the selling of farm equipment. From a canvass of over a dozen tractor makers and two dozen distributors, the deduction is that you sell from 90 to 100 per cent as many plows as tractors. You sell about 50 per cent as many disk harrows as tractors and approximately as many cultipackers. A few actual figures as to how such equipment sells may be interesting.

One dealer in Elkader, Ind., and he is a motor car dealer, during the past year sold thirty-three tractors and in addition sold sixteen threshing machines, fifteen plows, ten disk harrows, fifteen silo fillers and ten feed grinders. A dealer in Union City, Ind., who disposed of six tractors, also sold six plows, two disk harrows and four grain threshing machines. A dealer in Oxford, Mich., who sold 57 tractors expects to sell three hundred this year, and with every tractor sale go plows, disk harrows, silo fillers, etc. A Jackson, Mich., distributor last year sold 150 tractors with the usual equipment line. No matter where the dealer or distributor comes from you get the same report, namely, plows, disks, cultipackers, etc., invariably sell, in fact, the tractor is not an investment without such equipment. The extra speed of the tractor is such that the implements designed for horse pace will not stand up under tractor speeds. In fact, there is a good deal of farm equipment designed for horse walk pace and they cannot be used at a 3.5 mile pace of the tractor.

Reverting to the tractor show: As an exposition of tractors and the many parts such as engines, bearings, carbureters, magnetos, spark plugs, wheels, radiators, stampings, castings that go into a tractor to which must be added plows, and all other power equipment to go with the tractor, the show was of a very high standard. It was held in eight buildings at the state fair grounds, these buildings being connected with covered passages. The exhibit of tractors numerically is not so large as at the shows held in Kansas City during the past few years, there being approximately fifty tractor makers exhibiting as compared with eighty at Kansas City last year. It must be borne in mind that the financial conditions have kept not a few makers away, but at the same time it can be concluded that those present have national distribution or are going after such, and among those absent are many that have had a very local distribution in the zone of the factory. There are a few absentees to which this does not apply. As an exhibition of tractors it represents a higher standard than ever seen at any previous exposition. Many of the poorer designs are missing, perhaps fortunately. There are missing several of what have been termed strap-iron jobs, and others evolved in small machine shops. You cannot but conclude that the elimination



A view through another one of the eight buildings housing this immense power farming equipment display. There was plenty of room around the exhibits

process is in operation and the engineering tone of the show is being elevated thereby.

As in the motor car field there are few new machines and very few new models exhibited by the established makers. It is another case of having to clean up inventories on existing models and sell the machines at present manufactured before announcing new ones. There are a few outstanding examples of where manufacturers have added a model to round out their lines just as our truck manufacturers have been doing during the past few years. The J. I. Case T. M. Co. has added a giant model 40-72 which is for 8-12 plows and is suitable for heavy construction work, operating large threshing machines, etc. This is just a large model of the existing line with a few necessary changes and the following table shows how Case now covers the tractor field, and has completed its line:

10-18 hp. for two to three plows.
15-27 hp. for three or four plows.
22-40 hp. for five or six plows.
40-72 hp. for eight to twelve plows.

This new Case is an engineering job from radiator to hitch. It represents the same standard of engineering in this giant class as is used in the smallest sizes. It marks a new epoch in this respect. It is a four-cylinder design with cylinders 7 by 8 in. and gives 90-95 hp. at 750 r.p.m. It has a fuel consumption of .7 lb. kerosene per horsepower hour which compares very favorably with the best motor car practice. All of its gears are forgings that are cut and hardened; it has a drilled crankshaft for pressure lubrication to the crankshaft and lower connecting row bearings as well as to the camshaft bearings and has been designed with accessibility constantly in mind.

The Best Co., of California, producers of a famous line of tracklayer machines, have invaded the East and are present with a new machine of smaller capacity than its larger machine, the Best 60. The new machine is the Best 30. It is an automotive type from stem to stern. Accessibility is a predominating feature of the whole machine.

Hart-Parr has also entered the small type class with its machine, the Hart-Parr 30. This machine is described in detail in the pages following covering the different models.

Farm Trucks Light and Fast

Another very interesting feature of the show was the display of farm trucks, which is another step in the solution of the farmers' motorization problems. The trucks exhibited, in the main were small, light, fast jobs equipped with pneumatic tires, capable of receiving many styles of bodies. All but two of the makes of trucks represented were made by makers of power farm equipment. It is natural to expect that the dealers handling the tractor lines of these manufacturers will be quick to appreciate the great value of these trucks, both from the standpoint of profit for themselves and the benefit to farm using the trucks.

While the tractor show is truly national (from a standpoint of exhibitors and wares shown, there could not be a better show), it is anything but national from the point of view of attendance of either dealers or farmers. Definite figures are not available, but approximately 80-85 per cent of the attendance was farmers from Ohio and one or two adjoining states, Indiana, Michigan, Pennsylvania and New York. The dealer attendance was very good on the two opening days, but dropped off very heavily by the middle of the week. It may be that many dealers attending the Chicago motor car show the previous week, spent Sunday in the Windy City and took in the tractor show on Monday and Tuesday. We definitely know that this was true with regards to dealers in the East and some from the Southeast who attended the Chicago show. There has been a good attendance of dealers and distributors from Ohio and adjacent territory, but not in numbers from other areas to warrant the title of national show from this viewpoint.

Tractor Show Statistics

Number of Tractors Exhibited (2-14 in. plow rating or more)	120
Plow Ratings 2	16
Plow Ratings 3	32
Plow Ratings 4	10
Plow Ratings 5	5
Plow Ratings 6	4
Plow Ratings 8	3
Plow Ratings 10	2
Track Layers	6
Wheel Type	33
Combination	2
Automobile Type Engine	52
Low Speed	20

An imperfect analysis of attendance, which is all that is possible at this time, points to the desirability of holding the national tractor show in Chicago, preferably the same week as the motor car show, so that dealers attending the motor show can attend the tractor show. There never has been a time when this was so necessary as today. A show held in Chicago will command national attention not only from dealers and distributors but from the press of the country, which is a consideration of no small value. The cost would not be materially greater.

The parts makers attended in much greater numbers than at either the New York or Chicago motor car shows. This was true with the show a year ago in Kansas City. This happened in the early days of the motor car shows and just as these parts makers one by one dropped out of the two national car shows so it is almost certain they will drop out of the tractor show. Were the tractor show held in Chicago the same week as the motor car show, it would permit all of these parts makers to maintain their headquarters in the Chicago hotels as they now do, and they would be able to serve their interest in the tractor as well as in the car and truck fields. There would be much economy from a parts man's viewpoint.

As a show for retail sales the Columbus show has not been a great "hummer." It was not expected to be. The farmer is not a very active buyer at present, but he did come out to look over the tractor and took a very keen interest in it. Some retail sales have been made and some manufacturers have received actual shipping specifications from distributors. One factory got specifications at its dealers here for nineteen carloads of tractors. The company admitted that this was not all due to the show, as many of these specifications would have so come in. The show may have speeded them up a little.

Farmer More Cheerful

The farmer is gaining in optimism and when the sun begins to shine in spring, when the birds sing and the flowers bloom, everybody is convinced the farmer will come back into the market. The farmer himself admits he will. Taber, head of the Ohio State Grange, with 12,000 numbers, speaking on this subject declared he was certain this would happen. It always has happened and unquestionably will continue to happen. G. B. Sharpe, assistant salesmanager of the Cletrac, who has been in the motor car business and has had over twenty years' experience with farmers, corroborates this view and adds that the farmer in the winter is inclined to be an entirely different individual as compared with the farmer of the spring, summer and fall. Once he finishes the winter hibernation and gets to work he has less time to think about himself, and consequently is in a better mental state.

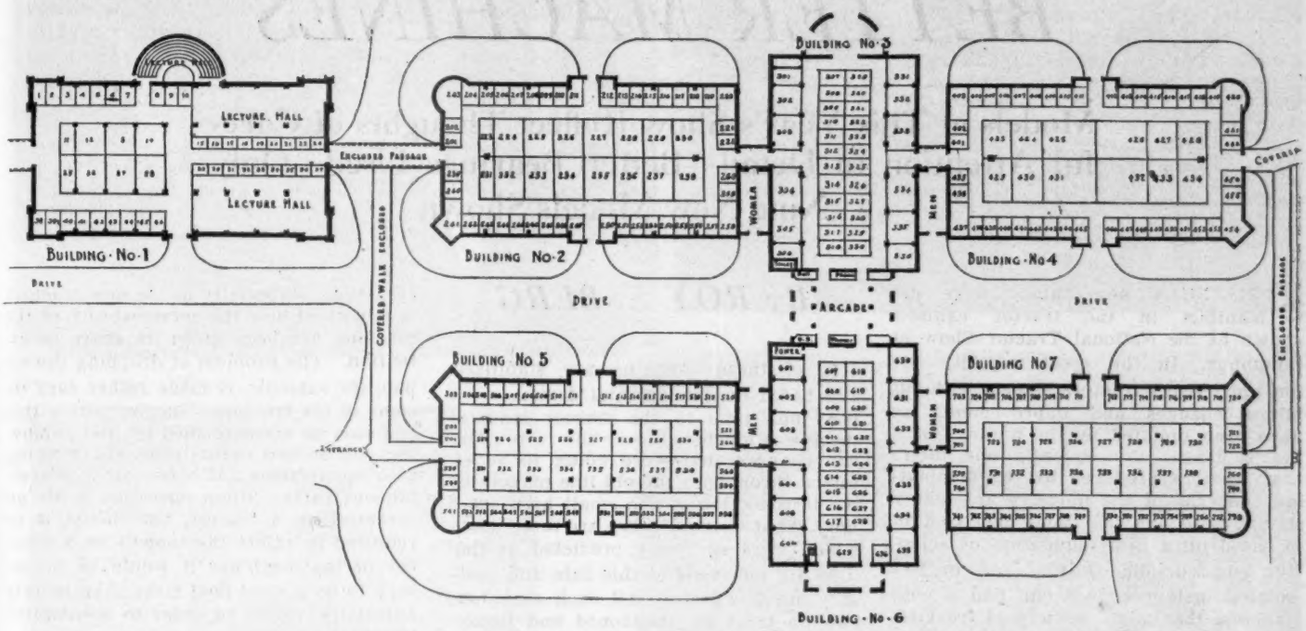
None of the tractor manufacturers look for a normal season. It may be a 50 per cent season. It will be less with some. A majority of the tractor factors have been practically closed for some time. This is a similar condition to that in the motor car and truck field. There are five or six that have been going ahead on a reduced basis and still are going ahead. Distributors are cutting their specifications for tractors in half, some are cutting them more than this.

The sentiment is very general that the farmers are not bankrupt as a few farm organizations have been trying to make out. It has developed this week that there have been some efforts among such organizations to get the farmer to hold back from purchasing implements of all character. Some of the tractor manufacturers claim to have copies and originals of letters addressed to farmers advising them not to buy under any circumstances. This is serious and there is a growing conviction that just as the farmer was very badly advised not to sell wheat until he got $3 per bushel, now he is being advised by similar interests not to buy farm machinery, the apparent reason being that prices must come down.

There were no price reductions announced at the show. The tractor makers are carrying heavy inventories. During the years 1913 to 1920 inclusive, the price of farm implements increased 78 per cent and in that same period the price of farm products sold from the

(Concluded on page 23.)

Eight Buildings Required to House National Tractor Show



The display of power farm equipment at the National Tractor Show at Columbus last week was on so gigantic an order that eight large buildings were required to house the exhibits. The floor plans of seven of the buildings are shown above; the eighth building, the coliseum, is not shown as it was farther removed from the group. Covered areaways led to each building. It is estimated that the attendance was 40,000, consisting in the main of farmers from Ohio and dealers from almost every state in the Union

Specifications of Farm Trucks Built by Farm Machinery Makers Exhibited at National Tractor Show

Make	Capacity	Wheelbase	Engine	Ignition	Carbureter	Electrical	[1] Power Take Off	Governor	Tires, Rear	Chassis Weight
Avery	2,000 lbs.	129 in.	6 cyl. 3x4	K. W. Mag.	Strom.	West. 2 unit	None	Fitted	Pneu. 34x5	2,600 lbs.
Case J. I.	4,000 lbs.	144 in.	4 cyl. 4¼x5¾	Mag.	.....	.....	Extra	Fitted	Pneu. 38x7	4,000 lbs.
International	4,000 lbs.	138 in.	4 cyl.	Mag.	.....	Extra	None	Fitted	Solid 36x6	.....
	7,000 lbs.	160 in.	4 cyl.	Mag.	.....	Extra	None	Fitted	Solid 40x10	.....
Moline	3,000 lbs.	130 in.	4 cyl. 3½x5	Split. mag.	Tillotson	.....	Extra	Fitted	Pneu. 36x6	.....
Rumely	3,000 lbs.	144 in.	4 cyl. 3¾x5¼	Mag.	.....	.....	None	Fitted	Pneu. Extra	3,950 lbs.
Samson	2,000 lbs.	118 in.	4 cyl. 3 11/16x5¼	Mag.	.....	.....	None	None	Pneu.	.....
Twin City	4,000 lbs.	.....	.....	.....	.....	.....	.....	.....	.....	.....
	7,000 lbs.	.....	4 cyl. 4¼x6	Bosch	Schebler	.....	None	Fitted	Solid 40x10	6,800 lbs.

TRACTOR INDUSTRY MAKING BETTER MACHINES

Models at This Year's Show Reflect Thoughts of Careful Attention to Detail—Better Bearings Used—Only Nine New Models Shown

By ROY E. BERG

STRIKINGLY new things were not manifest in the tractor exhibits shown at the National Tractor Show at Columbus. In the great majority one finds last year's tractors present with but minor changes and improvements as have been dictated by the findings of a year's usage. Consequently one infers that tractors produced by the dominating concerns of the industry are highly standardized and that their construction is based on a firm foundation of scientific construction. Only in one or two isolated instances does one find a construction that might be termed freakish. On the whole, it is apparent that whatever changes have been made are purely for betterment of the product.

On the one hand there is the automobile type of tractor, with a four-cylinder, four-cycle vertical engine, either valve-in-head or side valve L-head, having either a cone clutch, expanding shoe, or disk clutch with a transmission of two speeds forward and one reverse and the reduction gearing all enclosed, driving the wheels. Then, on the other hand, there is the low speed engine tractor with its cylinders generally horizontal and the remainder of its parts corresponding very much to the type described. These two types, however, do not include all of the tractor industry, for with certain modifications and in some cases wholly differently constituted types, we have the tracklayer tractor and those having a combination of tracklaying tread and wheels.

CLEANER DESIGNS NOTED

One factor that places a significant index over this exhibition, distinguishing it from the exhibit of last year at Kansas City, is the difference in the number of exhibitors. Last year there were approximately eighty exhibitors and this year about fifty. The absence of many of the formerly exhibited tractors has added a touch to the scheme of the whole show in the matter of clean cut designs.

The well established tractor makers, fortified with ample funds, are making progress in the way of rounding out their line so their dealers may have a full and complete offering for the tractor buying public. And in the main these large companies producing new models follow out the same general lines of construction used in their other successful models, a trend which is indeed worthy of note, for it illustrates that the products of these concerns are stabilized, and based on fundamental design.

At one time in the tractor industry there was much talk over the revolutionary changes that were going to be effected throughout the old line makers by the introduction of the small high speed job. What changes there are to be made, which were so freely predicted at that time are not made at this date and probably never will be. All such curbstone opinion must be abandoned and forgotten. When the situation is fairly analyzed, one finds that sound engineering will always hold its own regardless of the peculiarities of application. The old lines of Aultman-Taylor, Advance-Rumley, Avery, Hart-Parr, Waterloo Boy and others are based on good engineering and consequently they may not be challenged.

SPECIAL TRACTOR DEMANDS

Many makers are finding, as their products are wracked by time, that what seems to be a fairly good bearing for ordinary use is not good enough for tractor use. It is not noticeable, of course, where the bearings are changed, in most cases, but very particular attention is being given to tractor bearings these days. This is especially noticeable too, for the farmers at the show always inquire into the bearing construction. They are not so much concerned with where the bearings are, but so long as there is evidence of a good substantial bearing they are satisfied. The dealers, too, are curious to know of the bearing construction and, last but not least, the salesmen are talking of the bearing layout in their jobs.

Gear enclosure is another subject that is receiving marked attention. Not so many years ago it was common to see many of the working gears of the tractor exposed to the dust. Now every means are taken to enclose these parts completely. Even in the tracklayer type tractors, the means for driving the tread is enclosed, a feature which was said could only be accomplished with great difficulty and at great cost, but the moderate priced tracklayers are now so driven.

Accessibility, the factor which is now one of the most important considerations in motor car construction, is becoming a very important factor in tractor construction. Especially in the new tractors is it noticed how the serviceability of the machine has been given its share of attention. The problem of dropping the oil pan, for example, is made rather easy on some of the tractors. But on others this can only be accomplished by first removing one or two radius rods, the steering gear connections and a few other miscellaneous parts. Silent operation is not an essential on a tractor, but should it be required to adjust the tappets on a number of the machines it would be necessary to do a good deal more than merely adjust the valves in order to accomplish this task.

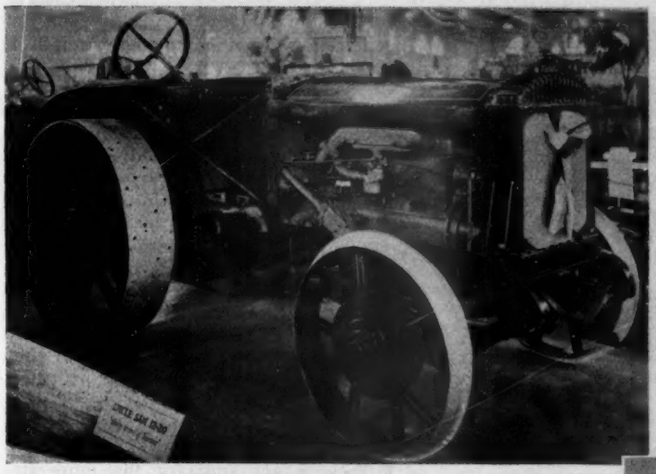
The new machines announced at this show show some very important development features in construction as may be gleaned from the descriptions which follow:

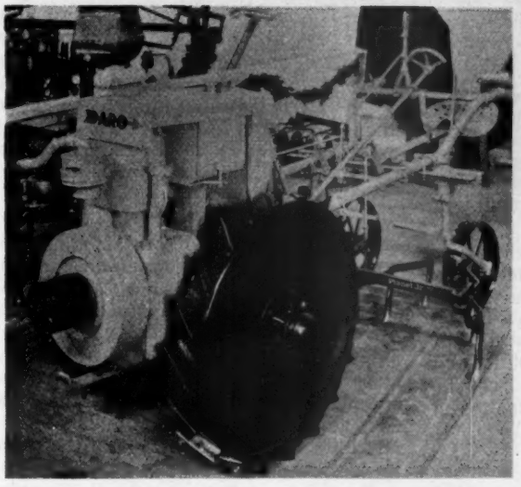
CASE

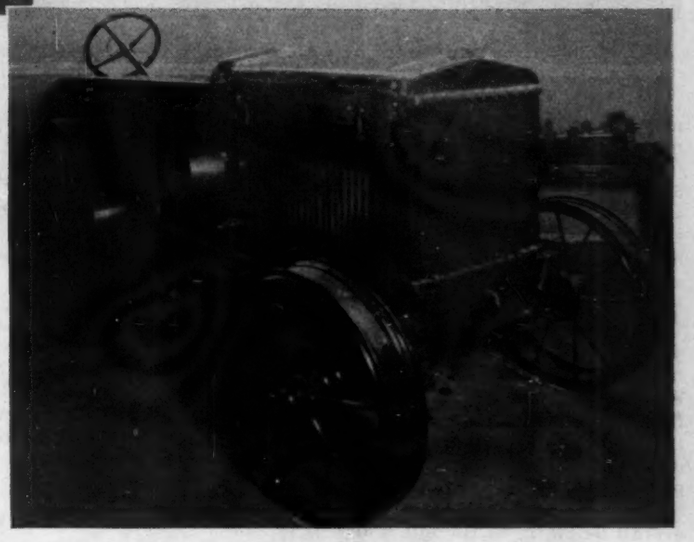
The J. I. Case T. M. Co. showed for the first time a 50-72 hp. tractor on modern lines. This machine follows the other Case designs in having all the transmission shafts parallel with the engine crankshaft, and using open gears only for the transmission of power to the rear axle. All gears are enclosed and run in an oil bath, which is a new feature for a tractor of this size. Engine, transmission and rear axle housing are separate units, which are bolted down to the channel steel frame by means of turned bolts. The frame consists of 8-in. and 10-in. channels, hot riveted.

The four-cylinder engine has 7 by 8-in. cylinders and runs at a governed speed of 750 r.p.m. Operating on kerosene it develops a maximum output of 90 hp. Two speeds are provided, 2.07 and 3-in. p.h. Characteristic of the robust construction is the 4-in. crankshaft, which has 4 by 4¼-in. crankpin bearings and main bearings of the following dimensions: 4 by 7⅜ in. next to the belt bulley, 4 by 5⅜ in. at the opposite end and 4 by 5½ in. at the center. Valves are 2¾ in. in diameter and have a lift of ½ in. Connecting rods are 17 in. long or more than twice the length of the stroke. The camshaft has a bearing diameter of 2¼ in. and the total length of its three bearings is 13½ in.

Pressure lubrication is employed, the oil being forced directly to the main bearings, camshaft bearings and crankpin bearings. A gear type of pump furnishes the pressure; it is driven by heli-







A Diversified Group of Power-Farm Equipment

Above, left—Uncle Sam tractor in junior form. This is a new model rated at 3 plow 12-20 hp. A unique feature of this tractor is the chain drive transmission, in which silent chains run constantly submerged in oil. Upper, right—This is the Boring tractor and cultivator. The machine has an adjustable tread enabling it to straddle a number of rows of corn. The implements are secured to the machine before the driver, thus enabling him to see the work at all times without turning around. The Aro garden cultivator, a small machine designed to permit one man to accomplish what a large tractor could not do. The Ohio tractor is a conventional four-wheel tractor, having a front axle slightly different, enabling the machine to remain practically horizontal regardless of the undulations of the ground

cal gears from the camshaft and is submerged in oil in a depression of the oil pan. The crankshaft is drilled for oil feed to the crankpin. An adjustable relief valve is provided, as well as an oil pressure gage, which latter is located in direct view of the driver's seat.

The belt pulley is mounted directly on the crankshaft. It measures 19½ in. in diameter by 10 in. width to face. A double disk type of clutch is fitted and serves to control both the belt power and the driving power.

The cylinders are cast in pairs and are fitted with renewable liners. Each pan of cylinders has a separate removable head casting. These head castings contain the valves and the spark plug holes. A truck type of radiator is fitted, without soldering joints in the tanks, behind which there is a gear-driven fan in a fan shroud. The centrifugal water circulating pump is located in an accessible position.

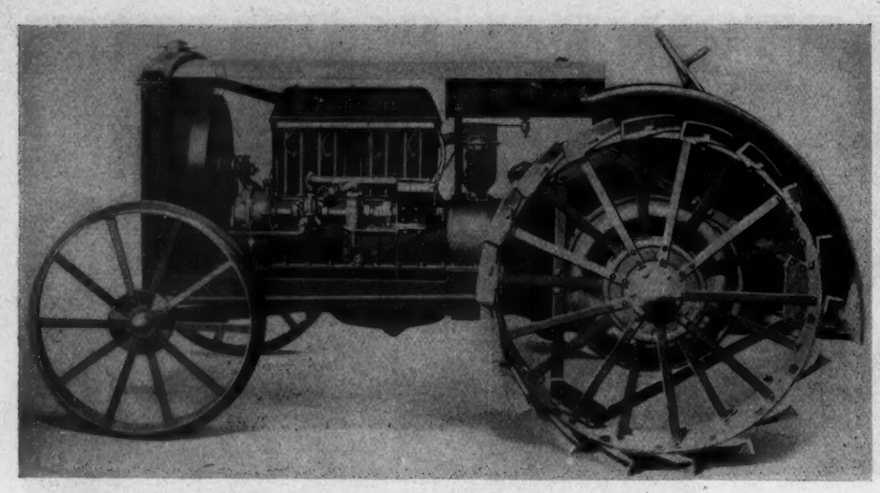
The differential gear is of the spur type, which is claimed to possess decided advantages for large powers, as it develops no side thrust and no thrust bearings are required in the differential. The differential is mounted on the bull pinion shaft which is 3½ in. in diameter at the bearings, each shaft being supported by two Hyatt heavy duty bearings. The bull gears are 42 in. in diameter by 4-in. face and have cut and hardened teeth of 1¾-in. diameter pitch. These gears are enclosed in dust-proof housings.

The rear wheels are 72 in. in diameter and 20 in. wide and are mounted on a 4-in. live axle rolled of special stock. This axle is carried in two Hyatt roller bearings. The front wheels are 48 by 10 in. in dimensions and are mounted on Timken roller bearings. The Case 40-72 Tractor has a wheelbase of 124 in., an overall length of 200 in., and width of 105 in., a height of 110 in. and weighs 21,200 lbs.

FARQUHAR

A. B. Farquhar, famous as an implement maker, is this year seen at the show with a four-wheel tractor, rated as a three-plow job of 15-25 hp. The tractor is assembled from well known units, using a Buda engine, driving an intermediate shaft connected with the transmission located over and slightly to the rear of the rear wheels. The tractor is steered and operated in conventional style. The final drive from the transmission to the rear wheels is through a spur gear completely enclosed.

Going more into detail, the power plant of this tractor is a Buda with a bore and stroke of 4½ by 6 in. It is located longitudinally with the engine frame. A KW



Allis-Chalmers is represented by a new tractor, a 12-20 model, which follows very closely in design the larger model. The engine is a four cylinder MidWest

magneto is used for ignition. The carbureter is Kingston make and two fuel tanks are provided, one for gasoline of 5-gal. and the other for kerosene of 25-gal. capacity. An air preheater is located back of the engine just over the bell housing. Engine speed is controlled with a Pierce governor operating normally at 900 r.p.m.

The steering is a worm and worm-wheel gear with the spark and throttle levers located on the steering-post center. The belt pulley is accessible from the driver's seat. This pulley is driven through a chain. The driving wheels are covered with large fenders and no moving parts are within reach of the driver's feet. The tractor weighs 5,700 lbs. Its overall length is 162 in.; its width 67 in. The wheel base is 83 in., and its ground clearance, 12 in.

BORING

The Boring tractor is somewhat different from the ordinary run of tractors in that it is a combination tractor and cultivator having a sufficient ground clearance permitting it to pass over corn 35 in. high, and having an adjustable wheel extension which will permit the machine to span two rows of corn. As a tractor the machine is of three-plow capacity. It is of the three-wheel type, having its two driving wheels at the front and a caster wheel used for steering located at the rear.

When plowing and cultivating, the implements are always before the operator, being located between the front and rear wheels. The frame extension which permits the wheel tread to be varied can be changed from a width of 54 in. to 79 in. by simply turning a crank located on the front cross member of the frame. The rear caster wheel is operated by a conventional steering gear enabling the tractor to be turned in a radius of 7 ft. The large drive wheels are 54-in. in diameter and are 10 in. wide.

The power plant consists of a four-cylinder Waukeshaw engine Model C.U. with a bore and stroke of 4⅜ by 5¾ in. This engine has a hollow crankshaft for force feed lubrication. The transmission has two speeds forward and one reverse. The high gear gives a normal plowing speed of 3½ miles per hour. Carburetion is with a Bennett carbureter and it is claimed that the tractor may be run on either gasoline or kerosene. A Bennett air cleaner is used, this being of the centrifugal type.

The power take off is on the right side of the tractor and is on the outside of the frame. It is independent of the engine clutch and is operated only when so desired. Its speed is 41-100 that of the engine. The tractor weighs 3,400 lb. and this weight is distributed with 3,000 lb. on the front wheel drivers and 400 lb. on the rear caster wheel.

ONCE-OVER TILLER

The Once-Over Tiller is a new form of farm implement that prepares a seed bed in one operation. It combines a tractor with a pair of plow bottoms and a pair of revolving implements, one at the side of each plow bottom, which break up or pulverize the soil as it is being turned over by the plow bottoms. The concern making this machine was formerly known as the Scientific Farm Implement Co., and in June, 1920, was reorganized as the Once Over Tiller Corp.

The machine somewhat resembles the motor plow made in several European countries, in that the plow is an integral part of the tractor. There are two front driving wheels and one rear trailing wheel, and the engine overhangs the front wheels a considerable distance. The power plant consists of a Stearns four-cylinder 4½ by 6-in. engine, the equipment including a 1¼-in. Stromberg carbureter and a Splitdorf magneto with impulse starter.

The transmission is of the company's own design and manufacture and is of the sliding gear type, giving three forward speeds and one reverse. The three forward speeds are 1¾, 2½ and 4 m.p.h., the intermediate speed being the plowing speed. All gears are cut and hot-treated and are enclosed and run in a bath of oil. The final drive is through internal gears which are also enclosed. Both ball and roller bearings are used in the transmission and on the axle. The differential gear can be locked when it is desired.

Steering is by a rack and pinion mechanism and the driver's seat and controls are mounted on the tube extending back from the steering yoke. All controls of both the tractor and the plow are within easy reach of the operator. Ordinarily steering is accomplished by means of the hand wheel which swings the driving wheels to one side or the other relative to the rear structure. But when it is desired to make a specially short turn, the operator can make the rear wheel a caster wheel by pulling a trip, and then by applying a brake to the front wheel on the side to which he wants to turn, he can make the machine turn on its own axis, it is claimed.

Following are some of the more important dimensions of the machine: The base, 116 in.; over-all length, including plows, 196 in.; total width, 65 in.; total height, 75 in.; minimum ground clearance, 24 in.; drive wheel dimensions, 54 by 10 in.; belt pulley dimensions, 13 in. diameter by 7 in. width of face. The belt pulley is driven at 900 r.p.m. and is controlled by a Twin Disk clutch.

UNCLE SAM

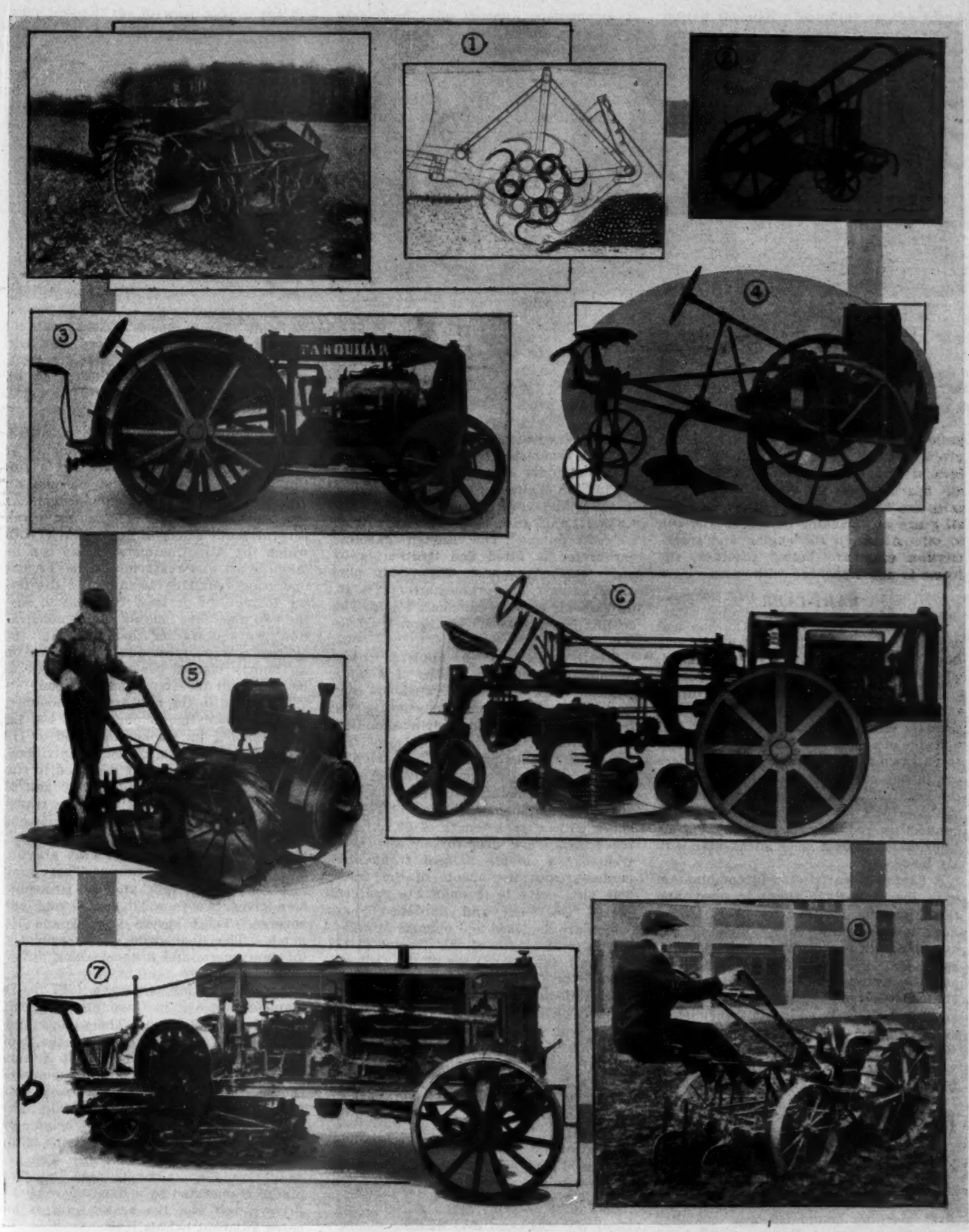
The U. S. Tractor & Machine Co., which heretofore has specialized on its 20-2 tractor, has added a 12-20 model which embodies quite a number of features not found in the 20-30. It is an assembled machine in so far as it has a stock engine, but the transmission is of special design and is made by the U. S. company itself. The engine is a Weidely and is mounted at the front in the usual way. Cylinder dimensions are 4 by 5½ in., and the governor speed is 1,200 r.p.m. A Bennett air cleaner and carbureter are fitted and ignition is by a Splitdorf magneto with impulse starter.

It is equipped with a separate clutch and may be run in either direction. One of the features of equipment is a bucket seat similar to that furnished on the Uncle Sam 20-30. The machine is rated to pull two plows under all conditions and weighs 3,000 lb. Its two forward speeds are 2½ and 3½ m.p.h. The drive wheels measure 45 by 10 in. and the front

BATES STEEL MULE

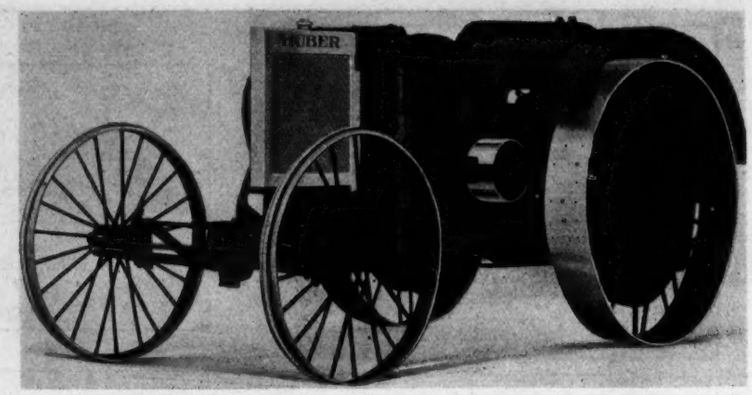
The Bates Machine & Tractor Co. have added a wheel tractor to their crawler type known as the Bates Steel Mule. The new model is identical with the older one from the front back to the rear axle. In this connection it deserves to be mentioned that the Bates company has adopted the Midwest engine. The rating is 15-25 hp. Motor, clutch housing and transmission are rigidly bolted together, forming one solid block which is mounted on roller-bearing axles. The transmission affords two forward speeds 2 1/3 and 3½ m.p.h.

The drive wheels are 48 by 10 in. and the front wheels 30 by 4½ in. The over-all dimensions are: Length, 131 in.; width, 63 in.; height, 60 in. The tractor complete weighs 4,000 lb. One clutch operates both the tractor and belt pulley and is controlled by a hand lever. This



1—The S. O. M. U. A., a machine made in France, was one about which the crowds gathered. The machine has a large revolving drum at its rear to which is secured a great number of sturdy steel hooks, which accomplish in one operation the tasks of plowing and cultivating. 2—The Sprywheel is a small light motor cultivator. 3—The Farquhar is a new tractor manufactured by an old established firm. 4—A small four-wheeled cultivator, the Perfection on which the operator may sit. 5—The Centaur is another small garden cultivator. 6—This is the Once-Over, a combined plow and cultivator. The knives which are shown just in front of the plows are power driven from the engine and when they rotate they cut the earth into fine particles. 7—The Hicks Parrett is a new tractor having a combination tread of wheels and tracklaying tread. The drive is by line control. 8—The Plant Jr., a small cultivator outfit

The new Bates Steel Mule is shown above. Except for the drive the machine is identical with the other Bates model. The Bates tracklayer model will be continued



This is the Huber Super Four. The engine is placed crosswise in the frame and the radiator is placed lengthwise. The makers claim a decided advantage for this construction, one claim being that no dust is blown by the fan upon the engine

pulley is 16 by 6½ in. in dimensions and gives a belt speed of 2,450 ft. p. m. Special emphasis is laid on the fact that all bearings of the transmission and axles are Timken roller bearings and that all gears are machine cut gears and run in oil. Although the engine and transmission case are bolted together, the frame is not dispensed with.

HART-PARR

Heretofore the Hart-Parr Co. has had only a single model of 30 belt hp. rating; now a 20 h.p. model has been added, which is a replica of the earlier model on a smaller scale, or a smaller brother, as the company expresses it. The two cylinder engine has a bore of 5¼ in. and a stroke of 6½ in. and the tractor is rated to pull two 14 in. bottoms. Both cylinders are in one casting and the valves are in the head. The crankshaft main bearings are 2½ by 4 in. in dimensions and the connecting rod bearings, 2½ by 2¾ in. Lubrication is by a mechanical oiler with six leads.

A float feed carburetor in combination with the Hart-Parr shunt is used, and the tractor is designed for operation on kerosene. Ignition is by high tension magneto with impulse starter. The clutch is a Hart-Parr contracting band type and the transmission is of the selective sliding gear type furnishing two forward speeds, 2 and 3 m.p.h. All transmission shafts run on ball bearings. The drive wheels are 46 by 10 in. and the front wheels, 28 by 5 in. The frame consists of a single steel casting which is heat-treated. The machine measures 120 in. in length over all and 66 in. in width, has a tread of 62 in. (measured from outside to outside of wheels) and has shipping weight of 3,500 lb.

A very modern looking type of tracklayer tractor is the Best 30 of which the first machine completed was exhibited, according to report. Engine, clutch housing and transmission are bolted together into one unit which is spring-supported on the tracklayer frame not far from its center of gravity, so that nearly the whole weight is spring-hung. The engine is a Best four cylinder valve in head type with individual cylinders and a single removable head casting.

The cylinder dimensions are 4¾ by 6½ in. An enclosed centrifugal governor is fitted and governs the engine at 600 r.p.m. Lubrication is by pressure from a gear pump. The Ensign gasoline carbureter is fitted and ignition is by high tension magneto. The piston pins are floating. The crankshaft is 2⅝ in. in diameter and the camshaft 1¼ in. The cooling fan is gear-driven through a friction clutch.

Steering is effected by applying power to one truck only by means of a large multiple disk clutch operated by long levers extending transversely across the frame. The trucks are spring-mounted, each oscillating independently of the other. Hardened steel rollers mounted on roller bearings carry the tractor. The track center distance is 41¾ in., the standard equipment consisting of 11½ in. shoes with a track length of 61 in. The track links are drop-forged and heat-treated. A double flanged front idler contacts with the spools of the track. The final drive is through 3½ per cent nickel steel cut and hardened gears which are enclosed and operate in oil.

The total length of this tractor is 112 in., the height to the top of the radiator, 59 in., the over all width, 53¼ in., and the width inside the tracks, 30¼ in. The ground clearance is 11½ in., the draw bar height, 16½ in. and the ground pressure, 5.2 lb. per square inch. A 12 by 7 in. pulley is provided which at 200 r.p.m. gives a belt speed of 2513 ft. p. m. The tractor carries 2 gal. of fuel (either gasoline or distillate, though kerosene equipment can be furnished as an extra). The weight of the tractor is 7,400 lb. An upholstered seat with spring-supported upholstered backrest is an attractive feature of this machine.

ALLIS-CHALMERS

Allis-Chalmers, who heretofore have been manufacturing a four plow 18-30 and a single plow 6-12 model have just come out with an intermediate size having a 12-20 rating. This machine is of the frameless type and is, with exception of the engine, completely manufactured by the Allis-Chalmers company. It has evidently decided to get out a full line of farm tractors and become an important factor in the tractor field. At the show a demonstration was given several times a day of the rapidity with which the Allis-Chalmers engine can be taken apart and reassembled, the former operation requiring 10 min. and the latter 15 min., or or less. Needless to say, the two machines making the demonstration worked rather harder than the average garage mechanic doing work on an hourly charge basis, and seemed to be about all in after demonstration.

Returning to the new tractor model, it has a four cylinder engine of 4⅛ in. bore and 5¼ in. stroke, governed to 110 r.p.m. by an enclosed centrifugal governor. The engine is designed to run on gasoline and a supply of 20 gal. is carried in an oval tank over the transmission. A siphon type air washer cleans the air before it enters the carbureter. Fuel is fed to the carbureter by gravity. Lubrication is by pressure. The clutch is an expanding type and the transmission gives two forward speeds and one reverse. These speeds are 2½ and 3¼ m.p.h. The final drive is by enclosed internal gears, and a non-leaking differential is fitted.

The belt pulley measures 12½ in. in diameter by 6½ in. face and the belt speed is 3250 ft. p. m. The same clutch as used for driving controls the belt power. A brake is provided to act on the brake drum. Following are some of the more important dimensions of this tractor: The total length is 135 in.; the total width, 66 in.; the total height, 60 in.; the wheel base, 75 in.; and the minimum ground clearance, 13 in. The net weight of the tractor is 4400 lb. The clutch is operated by a hand lever at the driver's left and the brake lever is located adjacent to this lever.

The front axle is in the form of a casting of hollow section and is pivoted to the engine crankcase at the front, the gear case cover being extended to form a yoke for the axle. Radius rods extend from the ends of the front axle to a bal-

ance lever at the forward side of the flywheel bell housing. A spring keeps the fan belt automatically under tension. One half of the bell housing is cast with the lower and one half with the upper part of the crankcase. A column mounted on the transmission housing serves to support the steering column and the control levers.

LA CROSSE

A small tractor with the line drive feature was shown by the La Crosse Tractor Co. This tractor has a 6-12 h.p. rating and weighs in the neighborhood of 3,000 lb. It will pull two bottoms. It has been hooked up with practically all implements that horses now handle, and one of the selling arguments put forward by the manufacturers is that it is not necessary with this tractor for the farmer to buy special equipment. In addition to the line drive this tractor has friction drive, which consists of a friction roller adapted to engage with either of two concentric friction drums, one giving a forward speed and the other the reverse.

The engine is a two-cylinder horizontal one, 4 by 6 in. It has two ball bearings on the crankshaft and reinforced die-cast bearings on the crank pins. The valves are located in the cylinder heads and are enclosed. The tractor is steered by means of steering knuckles operated by the lines, but it also has differential brakes which are automatically applied by the steering mechanism and the applying mechanism can be adjusted to put these brakes on when the steering wheels have been swung around through any desired angle. There are only two speed reductions from the engine crankshaft, first through the friction wheel and drum and then through a lantern wheel and internal gear. The latter is cast in eight sections.

HUBER

The Huber 15-30, 3 plow, termed the Super Four, is a new addition to the Huber family. The machine is of the four-wheel type with driving parts all enclosed. The engine is set transverse in the frame as is the radiator. By this construction the front end of the tractor is made very narrow permitting the wheels to be cramped to an extremely short turning radius. The tractor is designed to attain maximum pulling power with the lightest weight consistent with sturdy construction.

The engine is a Midwest with bore and stroke of 4½ by 6 in., controlled in speed from 1000 to 1200 r.p.m. A Kingston magneto and Kingston carbureter are fitted to the tractor. The magneto is fitted with an impulse starter. A dry disk clutch is used, all enclosed. The engine being set transversely in the frame permits of the reduction gearing being made by spur gears from the engine to the wheels.

OHIO

The Ohio tractor is a typical automobile type of tractor. Its bonnet gives one the impression of a motor car construction, and it is rather light in weight, weighing only 4950 lb. The machine is assembled; the various components in the make-up are well known units. The engine is a Wisconsin model V, A. U. with bore and stroke of 4½ by 6 in., governed to run at 950 r.p.m. An improved tractor type Wheeler Schebler carbureter is fitted, and the ignition is from an Eisemann magneto. There are three forward speeds in the transmission with one reverse, giving as the forward speeds 1¼, 2½, and 5 m.p.h.

HICKS-PARRETT

The Hicks-Parrett tractor is a combination crawler and wheel type machine, having a line drive control. The tractor weighs 7850 lbs. It is a three-four plow job and is rated as a 20-30. Its power plant is a Buda engine of 5 by 6½ in. bore and stroke. An internal expanding clutch delivers the power to a short shaft directly back of the engine which is longitudinally placed in the frame. This short shaft is located above the engine center and is driven by a one to one ratio gear. From here the power is transmitted through a coupling to the transmission which has two forward speeds and two reverse. In forward the tractor speeds are 2.4 and 3.4 m.p.h. Ignition is through a high tension magneto. The line drive of the machine is operated in the same fashion as a team is driven. The breaks may be applied by these lines through a differential gear set.

S. O. M. U. A.

A tractor first shown at a National tractor show is the S. O. M. U. A., a French machine which is entirely different from anything heretofore exhibited. The principle of operation consists of driving a large revolving drum having secured to it a great many wire hooks and these dig into the ground to any desired depth up to 12 in. The machine is driven by a four-cylinder engine which also propels the revolving element at a high rate of speed. It is claimed that with this machine no cultivator is needed for the machine is esentially cultivator itself, but acting also as a plow.

Garden Tractors Shown in Two- and Four-Wheel Types

SPRYWHEEL TRACTOR

"Sprywheel," a name peculiarly adapted to the cultivator so styled is a new exhibit among the garden tractors. The machine is very light in weight and on the pocket book costing but $150. It has a single cylinder engine, two cycle, air cooled with a bore of 2½ in. A simple jet vaporizer is used for a carbureter. A spur gear from the engine drives the single wheel, front wheel and the remainder of the weight of the machine is carried on the two rear caster wheels. The speed of the cultivator may be varied from 1½ to 4 m.p.h. The machine is made by H. C. Dodge, 280 Madison ave., New York.

ARO GARDEN TRACTOR

The Aro is a new garden tractor shown for the first time at this show. It is of four wheel construction and the operator rides upon the machine. The engine is single cylinder, vertical with bore and stroke of 4½ by 5 in. The crankshaft is ball bearing carrier being mounted on Hess Brights. The engine develops from 2½ to 5 hp. It is lubricated by a combination of force and splash and force feed. Different width rows can be suited with this machine as the tread is variable from 24 to 31 in. The speed of the machine can be varied from 1 to 3 m.p.h.

PERFECTION

The Perfection is a small tractor of four wheel construction with caster wheels on the rear carrying the weight of the operator. The engine one cylinder, bore and stroke being 4½ in. square. Its speed is governed at 800 r.p.m. The machine weighs 1200 lbs. The engine is air cooled and is completely enclosed. The air is drawn down around the cylinders by the action of the flywheel. Carbureter and magneto for this job are both supplied by the Bosch Magneto Company.

UTILITOR

A number of changes in design have been made in the Utilitor tractor whereby the power of the engine has been materially increased. The engine was retimed and the valve lift increased 1/16 in. At the same time the inlet manifold was opened up so as to give the gases a freer entrance into the cylinder. The shape of the combustion chamber was changed somewhat and the compression was raised 10 lb. p. sq. in. Removable valve stem guides were put on, as well as a variable speed governor. The magneto drive was improved and the location of the spark plug changed so as to place it in the path of the incoming charge. The piston is now relieved eccentrically instead of all around. The connecting rod bearing is now oiled by means of an oil ring catching oil, in addition to the oil it received from the splash.

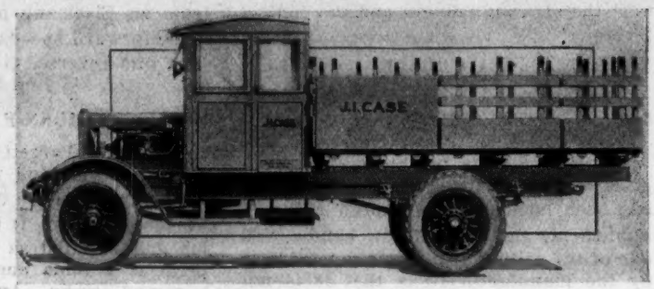
PLANET GARDEN TRACTOR

The Planet is another garden tractor or cultivator introduced by an old implement company, the S. L. Allen Co. of Philadelphia. This machine has four wheels, the two front ones being the driving and weight carrying wheels and the rear being merely caster wheels. A small single cylinder engine is used which is air cooled. The wheels of this machine adjustable in width to 24, 30 and 36 in. apart.

The other cultivators shown were the Oldsmar, the S. O. M. U. A., a French design, but now introduced here; the J. I. Case, the Toro, the Traylor, the Beeman, the Central, and the Avery.

Trucks to Meet Farm's Needs

Several Old Established Tractor Makers Introduce Farm Trucks at National Tractor Show. Farm Truck in General a Small Machine with Pneumatic Tires



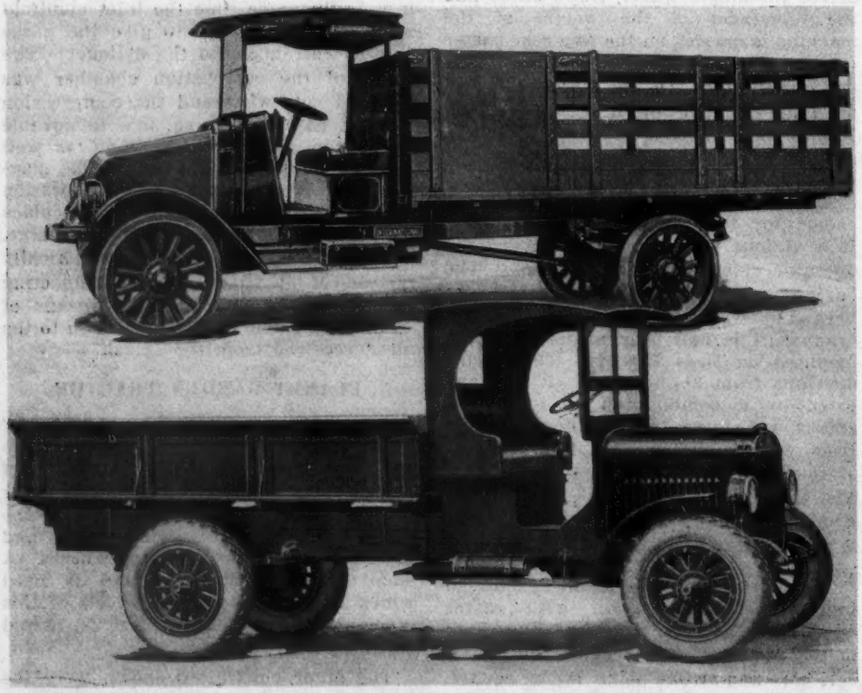
The J. I. Case Plow Works introduced this farm truck at the show

ONE of the features of the show at Columbus, which introduces a new thought in National Tractor shows, is the large display of farm trucks, which was made by makers of power farming operative equipment. This important feature is not a passing whim of the makers of power farm equipment but is another important step in the motorization of the farm. Transportation for the farmer is as important a step in his daily routine as is this same factor for the manufacturer. Without efficient transportation to enable the farmer to move his products to market he is lost. Therefore we find the farm truck.

Nine makes of farm trucks were exhibited at the show. These were the Avery, Samson, Moline, J. I. Case, International, Atlas, Twin City, Rumely and Graham Bros. Pnuematic tires are standard equipment on all these trucks, although Advance-Rumely who exhibited two trucks had solid tires on one of them, as did the 3½ ton 2 ton models exhibited by International.

In general the farm trucks display certain characteristics, distinguishing them from other light weight trucks of the speed wagon type. The farm truck it seems should be provided with a power take-off which it is noticed has been applied to several of the trucks exhibited at the show. Several of those whose trucks did not have the power take-off applied had provided arrangements for the application of one. Pnuematic tires seem to be essential on a farm truck, but there is some argument as to the correct size of tire. The average motor car tire size is 4 in. in width, but of course this is not sufficiently heavy tire to withstand truck loads. Some passenger cars use a 5 in. tire and these are not too wide to run conveniently in the average rutted road. But where a tire is applied of 8 in. width or perhaps 7 in., the side walls of the tire are apt to be scarred up and eaten away by the action of the ruts.

High speed is not essential to a farm truck, but they should be able to pull, and this is a characteristic factor of the trucks shown.



The International Harvester Co. exhibited several trucks, the one shown above being one of the large models
Lower—Rumely was present with a farm truck equipped with pneumatic tires

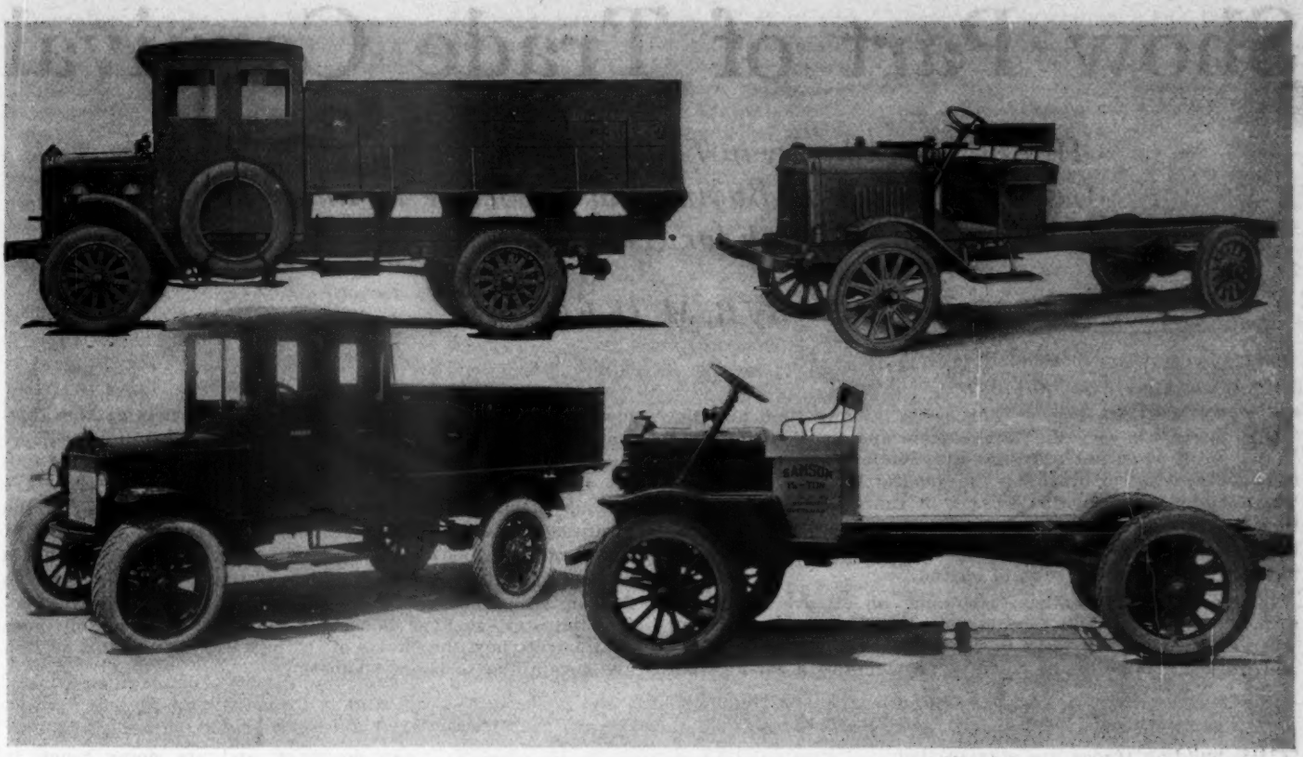
J. I. CASE TRUCK

The truck exhibited by the J. I. Case Plow Works is a 2-ton job designed for farm use, and is priced at $3,000. The power plant is identical with that used in the Wallis tractor with the exception that the water pump is moved to the right side of the engine. The cylinder dimensions are 4¼ by 5¾ in., and the engine has a normal speed of 900. The Twin Disk clutch and a 3-speed gearset are mounted as a unit with the engine. The steering gear is a Ross, and the springs are half-elliptic all-round. The Hotchkiss drive is used. The gasoline tank, which has a capacity of 20 gal., is mounted on the dash. Goodyear cord tire are standard equipment, the sizes being 36 by 6-in. front, and 38 by 7-in. rear. Other standard features are stake body, cab, towing hooks front and rear, electric lighting and power tire pump. A power take-off, which is mounted on the front of the engine, is furnished for $150 additional.

AVERY TRUCK ONE TON CAPACITY

Avery was represented by a farm truck, having a six cylinder engine. The truck weighs about 2,600 lbs. and is equipped with pnuematic tires. Its capacity is 2,000 lbs. The tire size is 34 by 5 in.

The engine of the truck has a block



Well Known Tractor Makers Announce Farm Trucks Shown Above

Above to the left is the Moline 1½-ton truck with pneumatic tires. The truck to the left is the Twin City. Below to the left is the Avery six cylinder truck and to the right is the Samson farm truck, a product of the General Motors Co. The seat is placed well toward the front, immediately behind the engine

casting for the cylinders. The bore and stroke being 3 by 4 in., its rated horsepower is 21.6. The crankshaft has three main bearings which are fitted in die cast metal. The diameter of the shaft is 1¾ in. The head of the engine is removable. Cast iron pistons are used. The lubrication is by a force pump to the bearings with mist produced by the splash for the remainder of the parts.

The transmission provides three speeds forward with reverse, and a multiple disk dry plate clutch is used to drive the transmission. The electrical equipment of the truck consists of a two unit system of Westinghouse make for both starting motor and generator. Hotchkiss drive is used and the springs are therefore of the semi-elliptic type at the rear. The front spring, however, is a transverse spring. The rear axle is Torbenson make, having an internal gear drive. The steering gear is Ross make.

THE MOLINE TRUCK

The Moline truck is of 1½ ton capacity. The wheelbase of the truck is 130 in. A power take-off can be furnished if desired. Pneumatic tires are used and these measure 34 by 5 in. for the front and 36 by 6 in. for the rear.

The engine used is the famous Moline Universal tractor motor. It uses the very convenient valve adjustment for the overhead valves. This adjustment consists of a small ball ended stud screwed down from the top of the motor which fits into a cup or hemispherical section of the rocker arm. By turning the screw or stud from the top with a screw driver it is possible to adjust the valves of the engine while the engine is running.

Ignition is with a Dixie magneto and the carbureter is a Tillotson. The steering gear is Ross make. All chassis connections are Alemite lubricated. The springs are semi-elliptic and are made of chrome vanadium steel. The front springs measure 38 by 2¼ in. and the rear 52 by 2½ in. Eleven leaves in the rear springs and nine leaves in the front are used.

Three styles of bodies can be furnished: these are a farm body, a stake body and an express body.

SAMSON

The Samson truck, a product of the General Motors Co., was also shown. This job is 1¼ ton capacity, and a particular feature of the truck is the method in which the chassis is laid out, giving a large loading area on a small wheelbase. The engine is set well up on the forward end of the chassis, and the driver's seat is placed to the left of the engine and directly in back of it. In this way the loading space is not crowded because of any attempt to give the driver sufficient room to work in. The wheelbase of the truck is 118 in. A four cylinder engine of 3 11/16 by 5¼ in. bore and stroke is used having a piston displacement 224.3 cu. in.

A very large and rigid torque tube is a noticeable feature of the chassis, which relieves the springs of the driving strains. The torque tube also takes the reactions of driving and braking. The springs are semi-elliptic all around and the wheels are fitted with pneumatic tires. The electric system consists of a high tension magneto for ignition and other electrical equipment can be furnished if desired.

Two types of bodies are furnished, one a stake body and the other a partially enclosed body to which tight fitting curtains may be applied making it practically a closed body.

Other makes of trucks, made by makers of farm machinery were the Rumely truck, the Twin City, and the International. Graham Bros., makers of the Graham truck and the Atlas Truck Corp., each exhibited a small light weight, pneumatic equipped truck suitable for farm work.

CASE ON THREE-DAY SCHEDULE

Racine, Wis., Feb. 10—To aid workers to overcome the effects of a period of unemployment, the J. I. Case Plow Works Co. of Racine, Wis., manufacturer of Wallis tractors, tractor implements, plows, etc., has instituted a schedule of operation of three days per week. Preference is being given to married employes and single men supporting others. Several other large industries in Racine are following a similar plan.

Show Part of Trade Carnival

All Lines of Industry in Twin Cities Push Movement to Get Public Back to Buying and Set Aside to This End a Week for United Effort

By B. M. IKERT

MINNEAPOLIS, Feb. 9—This week is more than automobile show week for Minneapolis and St. Paul. It is a week when not only the automobile, truck and tractor men are seeking to break up the general business stagnation which has hung over this section of the country for a long time, but a week when the merchants, the bankers, the wholesalers, in fact, the whole community is behind a great movement to get the public back to buying.

Business revival meetings are going on all over the Twin Cities. The automobile show is but a part of a general plan wherein a community seeks to take matters into its own hands and work out some of the common problems by a get-together method. What the merchants are doing is helping the automobile show and what the show is doing is helping the merchants. Those who could not for some reason or other get into the shows and exhibitions going on all over the two cities are staging little exhibitions of their own. Practically all of the business houses carry suggestions that this is trade week. One large dry goods establishment has in its corner window a roadster and it is not uncommon at the automobile show to find on exhibition some things entirely foreign to the automotive industry, such as household goods, etc. It merely goes to illustrate how the efforts of the business men of this section are dovetailing to boom business.

THE building trades are staging their own show this week at the armory and the furniture men are getting people into their places of business. The whole country around here is seething in a trade carnival, the effects of which will be interesting to watch. The dealers at the automobile show are selling cars; sales are being made in the downtown showrooms of the dealers, too. Before the show opened the salesrooms were empty. The last few days have shown a change. A walk along motor row shows that people still are interested in cars and want to buy them, because the salesrooms show activity this week. The automobile show this year is held two miles out of the city, whereas formerly it was held on the Midway leading to St. Paul.

Naturally a poor location caused the management some worry but they went to the business men of this community and laid down the cold facts that unless everybody co-operated to put the show over there probably would be no show. This was something like 30 days before the show. The result was a meeting of big men in commerce, finance and industry with the automobile men and there was formed the Minneapolis Automobile Show & Trade Week Association. And that is why the whole community around here is boosting the show. While the show is quite sure to stimulate buying of automobiles to some extent the general business situation around here would seem to indicate that the buying process will be slow, but steady. It must be remembered that some dealers here have not sold cars for five months; others, a few. So there is a certain potential market for cars and one dealer even goes so far as to state that he will sell as many cars or more as last year and it was no small number he sold.

Summary of General Conditions in Northwest

UNFAVORABLE—

1—Frozen credits, widespread in the country districts through insistence of farmers in holding their wheat, the holding being said to average 40 per cent of the crop.

2—Generally weakened buying power as result of depressed prices of practically all products except butter and eggs, coupled with some unemployment, principally in the cities.

3—Resentment of farmers against more rapid decline in price of the things they sell than of those they buy.

FAVORABLE—

1—Absolute necessity of a considerable volume of purchases, principally for replacement of cars, trucks, tractors and equipment.

2—Unstocked condition of country dealers, who average less than a car apiece on standard lines and who are beginning to appreciate danger of a spring shortage with themselves at the short end.

3—More active effort by dealers to search out prospects with money to buy—one dealer gave out cards at the show, for instance, entitling the bearer to a demonstration, and some others getting down to a basis approaching intensive canvasses of their selling fields.

4—Savings banks deposits in both Minneapolis and St. Paul are steadily increasing.

But the service question is interesting at this time. This city has a service managers' association and its members can do much and are doing much to stimulate buying. One dealer has kept his organization together this winter entirely through the efforts of his service manager. This man made a house-to-house canvass so to speak of the business men to whom cars had been sold and sold them enough service work to keep his men busy the year round.

The service men around here are strong for giving personal attention to their customers, a situation which will be reflected very largely this spring and summer when it comes to buying cars. There is one instance where a man has bought his fourth car of the same make from the same dealer because of the efficiency of the service. This section of the country is not so rushed as some of our eastern cities and car owners and service men or dealers take time to talk shop. A spirit of this kind is bound to help speed business back to a normal basis. And so while the dealers at the show are doing their utmost to revive sales the service men are doing their bit at the service stations during trade week. A good many sales this year will result no doubt through the efforts of the service managers up here, who are trying to make trade week their week as well as the week of the salesmen.

It has been a long, hard pull for this territory since the price of farm products, backbone of Northwest prosperity, struck the decline. The pull is not over yet by any means. Bankers and business men are pretty well agreed that tight money, principal obstacle to sales, will continue in a measure until the next harvest, when the bulk of farmer indebtedness to country banks and country banks' obligations to the city institutions will be liquidated. However, improved conditions in credits are in the offing and improved conditions in merchandising,

automobiles, trucks and tractors included, already are here. The "thaw" began in mid-January, with Minneapolis retail sales in both high and low-priced lines showing new life and with a small demand for cars from the territory. And now the show, needed as it was never needed before, is doing what was expected of it, giving the slowly improving sales situation a decided acceleration.

Demonstrating Buying Power

The show is bringing into the distributors' headquarters country dealers who have gone more than five months almost without sales, some who have not delivered a car or truck since late July and early August. It has brought in already 250 bankers and more are coming, many from long distances. It is bringing in the farmer customers of these bankers, who are prospects for the country dealers, many of them prospects with money to invest in automotive equipment, despite a general scarcity of ready cash in the territory. The show is demonstrating to all these, including some dealers from remote districts who arrived in town today with the notion that the automobile industry had "closed down," that factory wheels are turning and that demand, though suffering from weakened buying power, is alive and that there are people, if the trade will search them out, who have the money to buy. These out-of-town dealers are hearing the story of a Minneapolis car and tractor dealer who has been making sales—and for cash—right through December and January, on both his car and implement lines. He is in position to finance time sales, but he has found prospects, even farmers, who would buy for cash.

The show is exhibiting practically all the passenger cars and a majority of the trucks distributed from Minneapolis. The automotive equipment section is especially strong, with the Motor & Accessory Manufacturers' Association for the first time giving it national sanction and with accessory manufacturers and jobbers of the Northwest taking advantage of the opportunity to show before the home market. The truck section is given prominence by its location on the entrance floor. The exhibitors report plenty of attention, a few scattered sales and a good grist of prospects, a condition which is bettered on the passenger car and accessory floors.

The show has dancing, movies and a restaurant, traditional features of the Minneapolis exposition. And though it is two miles out, it is the center of Minneapolis this week and its overflow already is appearing on salesroom floors which have been rather lonesome places for a long, long time.

The open winter has hurt the automobile business as much as it has helped it, because it has left huge unsold stocks in the hands of many firms handling goods dependent upon normal winter demands, thus contributing to the depression of general business.

Bankers Look for Volume Business

Even the most conservative bankers here, with funds heavily loaned to country institutions and thus closely in touch with territorial conditions, declare there will be a considerable volume of car, truck and tractor business this year. The fact that dealers are already getting some of this volume shows that as usual they are a few jumps ahead of the banker in analysis of their own business. The show has proven that optimism is based on fact and not froth. It has put new vigor into a trade that has suffered, and suffered acutely. It has pointed the way, as it has and as it will in other cities, to work, to selling, as the only "legislation" that will cure the ills of the day.

SERVICE—Dominant Demand of National Tractor Show

(*Concluded from page 12*)

farm increased 112 per cent. The price of all other commodities sold to the farmer increased 144 per cent. Labor increased 112 per cent. With these figures in mind, and they are the figures of the Department of Agriculture, the tractor maker does not feel that the farmer is just in his deductions that farm equipment should come down the same amount as grain prices have fallen.

A deduction of the show is that too often dealers sell tractors on the wrong basis of argument, endeavoring to show what it costs to do work with a tractor as compared with what it costs to do the same work with a horse. This is not the real appeal to the farmer. The farmer will buy much quicker on the fact that with the tractor he can do his plowing, for example, when it should be done, the increased capacity of the tractor as compared with the horse making it possible to do his plowing for example in Illinois before May 8, when he is insured of a better yield of corn per acre. It would be a week or perhaps ten days or two weeks later before he could complete the work with horses and the yield per acre would not be so good. The tractor becomes a production machine on the farm in the same sense that in a motor car factory a machine that drills 127 holes at one time in an engine casting is a production machine. Such a machine makes a cheap motor car possible and so a tractor will make it possible to raise corn cheaper. This is what the farmer must do.

Another example: To get the greatest yield of winter wheat per acre in Kansas you should plow in July or early August, a period when you cannot plow except on a very limited scale with horses. Here the tractor shows to its real advantages and demonstrates its value to the farmer. It does a job that is simply impossible with the horse. In such work you cannot draw comparisons between horse and tractor. The tractor is earning on a scale impossible with horses.

Another parallel is that of an oil man using a pneumatic tired truck: The pneumatic tires made it possible for him to go where he could not go with solid rubber tires. There was no comparison in cost, because with the pneumatic work was accomplished that was impossible with the solid tires.

Should Know Agriculture

Too frequently dealers do not know the scientific facts regarding agriculture in their territory. They get off on the wrong foot and instead of selling tractors that will bring further sales they sell tractors that kill further sales. Today the farmer will tell you that a gallon of kerosene costs as much as a bushel of oats and there is not much answer to this question if you are selling tractors on the mere foundation of a comparison of cost with that of the horse. Such a tractor sale puts the farmer in the incorrect mental attitude. He never does see the tractor in the production light that he should see it in. The tractor selling is not difficult if properly done.

Those motor car dealers making good on tractors, and there are thousands of them, are generally doing so by putting one man in charge of the tractor sales. There are instances where the same man sells cars and tractors and this is successful if the man has been born in the country and has had some experience on the farm. There are salesmen who prefer selling tractors to selling motor cars. There will be many more with this conviction a year or so hence. The salesman must have a knowledge of farm machinery, plows, disks, silo fillers, grain grinders, mowers, binders, corn harvesters, etc. Not a single one of these is an intricate machine. But most of all the salesman must know the chemistry of agriculture in his local territory; if weeds must be plowed under in the hot days in July in order to fertilize the subsoil.

The great increase in the industrial use of creeper type is one of the tractor trends that was emphasized at the show. The five and ten ton Holt models are very largely going into industrial uses such as lumbering, mining, road construction, and oil areas. Special improvements for use in lumber tracts have been added, such as bush protectors for the radiators and very heavy sheet underpans to protect the motor in case of hitting stumps. The use of individual cross anti-skid chains on the shoes of the Holt caterpillar for use on the ice roads in lumber camps has proven very successful.

EDITORIAL

The Logical Tractor Dealer

TO the right type of dealer the tractor industry is offering large possibilities. What the right type of dealer is need not longer be a matter of perplexity. The results of comprehensive surveys made by large companies are showing that there is only one type of dealer capable of selling the products of the tractor industry or rather the power farming operative equipment industry which is the broad and general name of this important business. This right type of dealer must have several qualifications. He must be able to sell the machinery correctly and to maintain it. Proper business management must govern his actions and further, he must be aggressive, for the profits of this business are proportional to the effort.

It follows that the automotive dealer is ideally fitted for the job, and this is borne out by the results of these analyses. When we have occasion to examine the statistics we find that no less than seventy-five per cent of the tractors are sold by automotive dealers or the exclusive power farming dealer, and as regards the relative importance of these two types of dealers the automotive dealer is infinitely better suited to the demands of the task. One company, which last year turned out about 11,000 tractors, finds that the great majority of the output was sold by a few automotive dealers, many of whom sold more than 100 tractors during the year. But this company finds also that its dealer list numbers 8,000 dealers, or on the average each dealer sold about one and one-half tractors during the year. Obviously, when a few dealers are able to sell over a hundred tractors during the year and the average sale amounts to less than two tractors each, and further when these business "getters" are automotive dealers the answer ought to be clear as to who is the logical dealer to handle the tractor.

Many automotive dealers have complained that the profits resulting from their tractor business was not commensurate with the labor necessary to sell the tractors. This may be true if considered in one light, but the trouble here lies in the fact that the tractors were improperly sold. A tractor with a plow is a thirty day a year piece of machinery. Every purchaser of a tractor is a prospect not only for a plow but for the whole line of equipment which may be applied to the tractor. Therein lies the answer to the profits in the tractor business.

Of course satisfaction must rule the customer's mind and service is the foundation for satisfied customers.

Fixed Price—Better Pay

ONE service manager who has been using the fixed-price system of computing the cost of repair jobs on owners' cars and who is further developing the system is responsible for the statement that the fixed-price system is so pleasing to the owner that he is paying more promptly than under the old blind alley system. In proof of this this service manager cites several examples of car owners who had credit accounts and who at times got 60 or 90 days behind, but who are now actually asking for the bill soon after the job is finished and paying in full before the end of the month.

Here is but another example of the many unlooked for advantages of the fixed-price system. The reason lies in a more satisfied customer. It is human nature merely to want to pay for good work when it is satisfactorily done. The fixed-price has wiped out misunderstandings. Scores of service men have agreed that the big trouble with service has been that the car owner imagines the bill for repairing his car should be $15 and he is simply dumbfounded when he gets a bill for $60.

Recently one car owner complained about an engine overhaul in which one item on his bill was 90 hours of work and a high rate. There was no explanation of what the 90 hours were for. Ninety hours is equal to over eleven days of eight hours each. In round figures it approximates two weeks' work. The owner's mind starts thinking on what he could do himself in working every day and all the time for two full weeks on the car. When he considers how little has been done and how many hours have been consumed there is little wonder that sometimes he questions the accuracy of the time clock. The fixed-price gets away from this difficulty. It is a 100 per cent human way of handling the job. In the words of Shakespeare: "It benefits him who gives and him who takes."

The majority of men are willing to pay an honest price for an honest job when they are sure such has been done. The fixed-price system admits of comparison on repair jobs between two or more makes of cars and the car owner is already aware of this. This develops a healthy rivalry between service stations and particularly those in which the same units such as engines, clutches, gear boxes or axles are used.

Makers Proceed With Caution

Question Which Confronts Them Is Whether Returning Business Is Here to Stay—Only Actual Demand Will Govern Their Production Schedules

DETROIT, Feb. 10—Automobile executives returning from the national shows bring back optimistic reports of returning business and are brimming over with enthusiasm but beneath the declarations there is the ever-present query "wonder if it's going to last." And between the sales and production ends of the automobile factories, opinions vary so widely in some instances as to reach almost the controversial stage.

At any rate manufacturers in Detroit territory are not going to be swept off their feet by the wave of optimism and led into production schedules not justified by the actual and constant demand. As one of the big men in the industry expressed it, "We hope for a return to normal and results of the national shows lead us to believe there will be an upward trend slow, but sure, but we are not going to make any predictions.

Attitude of executives toward production is indicated in the figures for January which show a total of 14,615 cars turned out of the 32 plants in Detroit and Michigan and the Overland and Willys-Knight plants in Ohio. This total is far behind that of December, though comparison hardly would be fair for the reason that the Ford plant operated up to Christmas. The output in the same factories in January, 1920, was 10,310, though these figures included production at both Ford and Dodge plants.

INCREASED SCHEDULES IN MARCH

While there are indications that production for February will not be increased to any extent the natural demand that will come with spring will prompt materially increased schedules in March. Whether this spring business will reach anything like normal proportions is a problem, but certainly it will mean resumption of operations in all plants with current demand determining the output schedules. It is contended by many and their claim is logical, that with the curtailed production of the last few months surplus stocks rapidly are being dissipated and factories will be kept busy supplying the demand after March. Their contention is admitted generally though the more conservative among manufacturers regard the term "busy" as meaning factories will be operating full time but with greatly reduced forces and production schedules ranging from 40 to 50 per cent of the 1920 record.

No one assumes to even guess Ford plans though the fact that parts makers have been given no orders to start is regarded as significant and builders of Ford parts are united in expressing belief there will be no production there until after March 1.

Dodge plans are equally mysterious. Dodge Brothers had a large surplus of cars in storage when production was stopped and although there has been some demand especially good in certain sections the stock in warehouses, in transit and in hands of dealers still is said to be large. President F. J. Haynes said this week no plans for reopening had been formulated.

Packard which went down ten days ago still is idle and the 30-day maximum fixed by Vice President Roberts as the shutdown period will find the gates closed.

Reo this week went on a 10-hour day full time schedule with the entire force working. Reo executives expressed confidence in continued improvements. The company delivered 1,800 vehicles in January, 720 of which were passenger cars and the balance speed wagons.

Paige reports renewed optimism among dealers and a slight improvement in sales, though not sufficient to justify an increased production schedule, and the plant will continue operation as at present, about 25 per cent normal.

There is no change at Hudson-Essex factories. The Essex plant still is closed, but a small force is building both types of cars in the Hudson plant.

Cadillac was down the great part of January and had comparatively no output, the employees being used in building up the parts stock. Cadillac began a schedule of 40 cars daily Feb. 1, but up to the present the factory has not reached that schedule and is building about 25. The company has outlined no schedule but will operate as the market dictates.

The Maxwell-Chalmers plants still are idle awaiting the outcome of reorganization efforts in New York.

Lincoln officials report an encouraging outlook from the sales end but schedules will not be increased until such time as sales justify that action.

Oldsmobile is working full time, building the new four and some eights. No trucks are being built save on orders. Olds reports many orders at Chicago Show, and an encouraging outlook, but the present schedule varying around 60 cars daily will be continued for the time being.

Briscoe is working 700 men full time, slightly more than one-third of the regular force. Briscoe officials bring good reports from the show, and say dealers are confident of the steady upward trend. The company built 600 cars in January and will not increase the output during February but will start on schedule of 30 daily March 1, and expect to increase the output until a maximum of 75 daily is reached.

BUICK PLANS UNCHANGED

Studebaker, which opened Jan. 17, built 800 cars in Detroit and the same number in South Bend. The schedule was increased to 525 cars weekly Feb. 1, in both plants, the company building the big cars in Detroit and the light six at South Bend.

Oakland is operating on basis of 50 cars daily and is striving to reach a production 50 per cent of normal, but officials do not expect to reach that point for the next 60 days. Good reports were received from dealers at the show, and survey of the situation reveals less cars on hand than at the same time last year. They report more Oaklands sold during the last 90 days than were manufactured, and by April 1 General Sales Manager Masten predicts a demand that will keep the factory busy constantly.

Buick built around 200 cars daily during January, and the same schedule will be maintained through February despite good show business and optimistic views of dealers. March production schedules will depend entirely on the demand during February. The factory is working full time but with short force. There was no production at Willys-Overland or

(*Concluded on page 26*)

The Dealer Will Set the Pace

WHILE the national shows brought results to dealers and distributors both in actual sales and prospects the lasting results of these exhibits are best reflected in the attitude of the manufacturers of automobiles.

Detroit, the center of manufacturing interests, shows a reflection of the optimism which is evidence at both New York and Chicago, but at the same time the first report since the conclusion of these shows, indicates that the manufacturers are proceeding with caution and are not letting their enthusiasm run away with their production schedules.

March, as a matter of course, will see these schedules somewhat increased but manufacturing will be carried on only in proportion to the actual demand.

Detroit Manufacturers Will Govern Production by Demand

While Executives Returning From Shows Are Optimistic They Will Proceed With Caution

(*Concluded from page 25*)

Willys-Knight plants during January, but it is hoped to clean up the surplus cars by March 1 and resume production.

Dort this week began production on the new models, and officials say they have orders ahead for 60 days. Vice President Averill says the great interest manifested during the show indicates renewed buying, but thinks that consumers will be more conservative and careful in the future, and does not look for a buying epidemic. Officials will not be led astray by enthusiasm, but will restrict manufacturing schedules to current demand.

Saxon did not produce any cars in January but began this week on the schedule of five daily. The Jackson plant is working full time with about 25 per cent of the force and is limiting production to actual sales requirements.

Hupp is employing about 30 per cent of the normal force and is now building about 20 cars a day. Hupp executives report the outlook good, and President C. D. Hastings was enthusiastic over the Chicago show.

President Sarver of Scripps-Booth said last week was the best week the company has had in a long time from a sales standpoint. This applied to the Chicago show and to the entire country. The company is operating a short force, and on a schedule of about 10 a day which will be maintained until increased demand justifies greater production.

Columbia reports improved business attributable to the shows, but will continue present production schedule at least during February.

WILLS-LEE STARTS WORK

Liberty is operating about 25 per cent normal, but reports more orders on hand today than at any time since last August. The present production schedules will continue during February.

Paterson is working full time with reduced force on closed models almost exclusively, building about one-quarter the normal number of cars. Officials say they have outlined no schedules, but will build in conformity with sales requirements.

Barley has about 45 per cent of its force working and built 80 Roamers during January. The plant has been running full time since Jan. 3 and will continue at present schedules for the next month at least.

Handley-Knight officials report cars selling as rapidly as they can be produced and reports splendid prospects for good spring business. The company is operating on a basis of 6 to 10 cars daily.

Wills-Lee will swing into production with new Sainte Claire today and will maintain a schedule around 10 daily for the time being.

Hayes-Ionia Co., which manufactures sheet metal and automobile body parts, now has about 300 men back at work at the plant at Ionia after a shut-down of several months.

Field Body Corp. at Owosso, Mich., reports encouraging increase in orders during the last few weeks. The plant has been virtually closed for several weeks.

The Standard Automotive Parts Co. at Muskegon, has resumed operations on a five-day a week schedule, employing about 15 per cent of the normal force.

The Campbell, Wyant and Cannon Foundry—one of the largest gray iron foundries in the world—will resume operations with a reduced force next week. The plant has been down about three months. Company officials report large orders from Reo and Hudson.

Production Foundries Co. at Ann Arbor also will reopen its plant next week though with a short force. The company devotes most of its production to Ford and will not increase operating force until the Ford plant resumes.

Dealers Join In Fashion Show For Hospital Benefit

NEW ORLEANS, Feb. 10—The Elks' Auto Fashion Show, in which every automobile dealer in New Orleans has promised to exhibit at least one car, will be held on Easter Sunday at the Fair Grounds. All net receipts will go to the Anti-Tuberculosis Hospital here. Society girls will drive the cars on exhibition, which are kept moving on the Fair Grounds race track and promenades throughout the ten or twelve hours of the show.

The cars are not to be decorated, and the entire show is in the open air. Prizes will be awarded for the best combination of costume with car. This show is one of the social events of the spring, and, last year, attracted 30,000 persons to the Fair Grounds. No attempt is made to sell the cars, and no advertising is allowed, but all the dealers believe participation in the show and the resulting newspaper publicity helps them in the actual business of selling cars.

ALL DEALERS IN ASSOCIATION

Norwich, Conn., Feb. 10—Every automotive dealer in this city and vicinity is enrolled in the newly-organized Norwich Automotive Dealers' Association. Officers of the association are: President, C. V. Pendleton; vice-president, Julian L. Williams; secretary, Daniel J. McCormick; treasurer, Alfred G. Lillibridge; directors, Bernard Ring and J. L. Williams. Plans are incomplete for the association's first exhibit and the date has not yet been selected.

Convention Points to More Electrical Service Stations

Question of Repair and Replacement Parts Taken Up at First Association Meeting

CHICAGO, Feb. 10—Thirty-one of the leading companies throughout the United States who specialize in giving service on automotive electrical equipment were represented at the first annual meeting of the Automotive Electric Service Association held at the Hotel La Salle here. The association was first organized in July, 1920, with a charter membership of fourteen companies.

At the meeting here some important changes were made in the constitution and by-laws. All references to classification of members were eliminated. The initiation fee was reduced to $25 and a new schedule of annual dues was arranged, based on the volume of the preceding year's business.

It was decided to continue the monthly association bulletin in printed form, and for the year 1921 the country was divided up into districts, with a chairman for each district, to be in charge of the collection of material for succeeding issues.

A joint meeting was held between the service association and the automotive electrical association, the latter organization being composed of the principal manufacturers of starting and lighting, battery ignition, magnetos and storage batteries. This joint meeting developed a high degree of co-operation between the two groups, looking towards the extension of automotive electrical facilities in the way of substantially increasing the number of authorized electrical service stations.

The manufacturers were a unit in recognizing their responsibility for the production of a sufficient number of repair and replacement parts, to take care of the demand, and both groups recognized that there is a great deal of work to be done in developing a satisfactory and adequate system of distribution for such parts.

W. J. Foss to Handle Sales of New Wills Car in Philadelphia

Philadelphia, Feb. 10—The new Wills-Sainte Claire car distribution company for this and adjacent territory will be located at 2033 Market Street. W. J. Foss, until recently vice president in charge of commercial affairs for the Pierce-Arrow Motor Car Co. of Buffalo and formerly of the Foss-Hughes Co. in this city, who will head the local distribution company, is known to have associated with him some of the strongest figures in business and banking circles in Philadelphia. The new car, which is being produced by C. H. Wills & Co., Marysville, Mich., has been shipped to distributors in "key" sections of the country as a start to introduce it.

Heavy Motor Truck to Be Taxed Out of Existence, State Plan

Legislators Say That This Is Only Way to Keep Down Upkeep Costs

ALBANY, N. Y., Feb. 10—"Heavy motor trucks will be taxed off the roads," under the plan of legislation being drafted here to meet the recommendations of Governor Miller's annual message. No secret is made of the intention of the legislation, the lawmakers taking the view that the use of heavy trucks imposes prohibitive upkeep costs, and that the best way to check this is to tax the heavy vehicles out of existence.

Under the proposed legislation annual fees of $500 are fixed for trucks of 5-ton carrying capacity; $600 for 6-ton; $700 for 7-ton, and $800 for 8-ton. Trucks of less than 5-ton capacity would be permitted to operate for from $50 to $90 a year.

License fees for passenger cars under the new proposed rate would not exceed 10 cents per hp., whereas the present rate is 25 cents. The bulk of the tax would apply on car value and it is estimated would add about $2,000,000 annually to the State's revenue.

"The high tax on motor trucks is being proposed with the deliberate purpose of putting an end to the use of super-motor trucks on our roads," said Senator Lowman, chairman of the Senate committee on internal affairs. "We cannot drive them off the roads but we propose to tax them off. They tear up the roads frightfully and make not only the upkeep of the roads but the cost of construction and maintenance of bridges along the State roads prohibitive. The interests involved must be compelled by the only means at our disposal to distribute the weight of their loads and use of smaller trucks."

Receiver for Revere Motors to Continue Operation of Factory

Logansport, Ind., Feb. 10—The Citizens Loan & Trust Co. of this city has been appointed receiver for the Revere Motor Car Corp. by the Circuit Court of Cass County in a suit filed at Hammond by C. Edwin Osborn and other stockholders. Under the order of the court, the bank will keep the company's property intact and the plant in operation for a sufficient length of time to permit the stockholders to refinance the company. A bankruptcy suit instituted recently against the Revere corporation was dismissed in Federal court after a special master had declared the company solvent with assets of $1,157,328 and liabilities of only $354,659.

The Revere corporation has been made defendant in damage suits aggregating $548,000 filed in the Circuit Court here by the Revere Motor Sales Corp. of Delaware. The complaints allege breach of contract, disregard of court judgment and inability or neglect to make payments on cars sold. The breach of contract suit asks for $450,000 damages. The disregard of court judgment suit seeks $25,000. The failure to make payments suits asks for $59,000, while a fourth suit asks for payment of $14,000, alleged to have been loaned to the local concern by the plaintiff company. Efforts for an amicable settlement of the case, started two months ago, have failed.

Further Steps to Pave Way for Operation of Sinclair Motors

Springfield, Mass., Feb. 8—Further steps have been taken, at a hearing before Referee C. W. Bosworth, in bankruptcy court here, to clear the way for the acquisition and operation by the New York syndicate of the bankrupt Sinclair Motors Corporation of this city. Trustee Charles Margerum of Hartford, Conn., was authorized by Referee Bosworth to effect a compromise with the Knox Motors Corporation by an entry of judgment for the plaintiff in seven replevin suits of the Knox Corporation pending in Superior Court, and also by the settlement of one action of tort for $1,850.

An agreement was also made for the discharge of the two receivers of the Sinclair corporation, G. A. Bausman and James L. Doherty, with the idea of saving expense, and a report of the receivers was received by Referee Bosworth. A number of workmen were in court on a petition for wages for the week ending October 9. It was announced that there are sufficient funds to cover their claims. Receiver Bausman reported that the preferred claims, including the wages of workmen, amounted to about $8,000.

Many Sales in City, Few in Country at Rochester Show

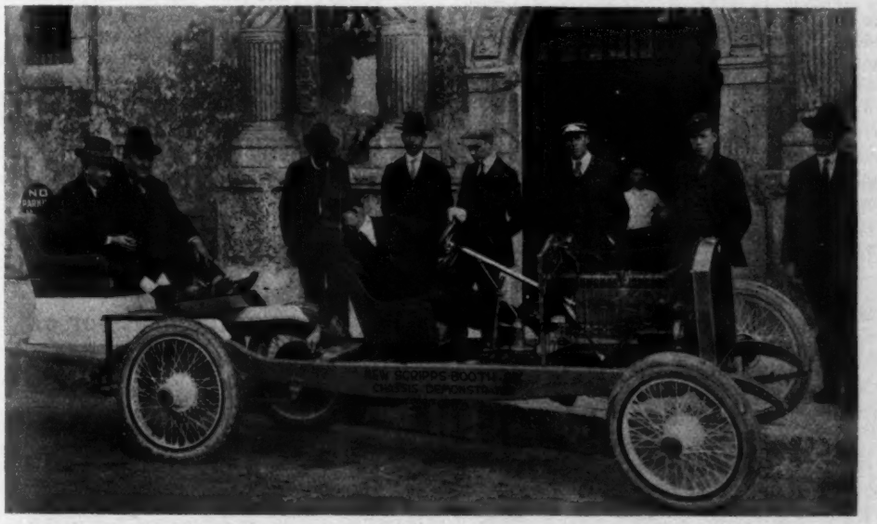
Visitors Come With Purpose of Buying—Attendance Below That of Year Ago

ROCHESTER, Feb. 11—The sales of cars valued at $1,350,000, five hundred and forty all told, and a list of prospects that far exceeded the demands of the dealers is what the members of the Rochester Auto Trade Association accomplished at the annual automobile show held here this week.

The passenger car dealers enjoyed one of the greatest, if not the greatest, weeks in their history in Rochester, but as to the motor truck and accessory dealers it was far below the ordinary of automobile week. The absence of complimentary tickets which marked the great attendance of other years, materially affected the crowds at the show this year, there being a decrease of at least 50 per cent, but it was a crowd that had the buying idea in mind, and not the flamboyant crowd of other years. Dealers estimate that six out of every hundred persons bought this year, while in 1920 the average was not more than two to every hundred.

The purchases of the persons from the country caused disappointment among the dealers, for few of the farmers came to buy. High prices of cars, and low prices for their products were the causes, dealers attribute, of the failure of the farmers to buy, even though there were numbers of them that attended the show during the early part of the day.

A Sales Promotion Idea That Interests Prospects



To show the prospect exactly what is happening underneath him when he goes riding, Richard Drake, sales manager for Simmons Motor Co., dealer and distributor of Scripps-Booth cars in the San Antonio, Texas, district, has fitted up a chassis with a comfortable seat for two extending back of the extreme rear end of the open frame far enough to allow the occupants to see every action of the mechanism and as the prospect will be taken over all sorts of roads he will see what action takes place under all conditions

Best Trade in Cars and Trucks Found by Reeves on Sea Coasts

Sales Spotty Elsewhere but General Upward Trend Is Apparent Throughout Country

NEW YORK, Feb. 10—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has just returned from a three weeks' trip in the west, where he addressed meetings of dealers, manufacturers and bankers in Wisconsin, Illinois, Missouri, Iowa and Nebraska. He reports encouraging signs of returning business, although after the spring trade future progress in automobile industry will depend largely on the progress that other industries made in returning to normal.

Information gathered on this trip, coupled with reports from other sections of the country, indicate that the best trade in cars and trucks at present is along the Atlantic and Pacific Coasts. It is somewhat spotty in other parts of the country.

New York, Pennsylvania, California, Ohio, Illinois and Wisconsin seem to show the best sales, while the poorest sections appear to be through the south, particularly Texas, in the Dakotas and in Iowa and Nebraska, although with a general upward turn everywhere.

DEALERS SHOWING FINE SPIRIT OF CO-OPERATION

"As in 1917, 1918, and 1919, automobile shows have marked the return of buying in this country and a change of spirit not alone in our own industry but among men generally," said Reeves.

"Surveys in the different sections of the country supplied the interesting information that buyers are waiting for lower prices or more stable prices. They want to be sure that prices will not be changed within the next few months. Almost all say they intend to buy another car and when asked the kind, invariably mention a car of higher price than the one they are using.

"We find dealers with their houses in order and in the right spirit for a spring sales campaign. They have some grievances against the manufacturers, just as the manufacturers occasionally have grievances against the dealers. That there is a fine spirit of co-operation, however, is evidenced by the acceptance by the directors of the N. A. C. C. of the suggestion by the National Automobile Dealers' Association for a conference of committees to review trade conditions to see what can be done in a co-operative way that will be mutually helpful.

"Everywhere we find a high appreciation of the need for the motor car and the substantial basis on which the automobile business has been built. Our investigation shows that with a few exceptions, the bankers have cared for our industry as well as they have other industries and they are not to be blamed for resenting the occasional statement that because one or two banks speak disparagingly of the automobile business, all bankers should be put in the same class.

"We had a long session with Governor Miller of the Federal Reserve Bank of Kansas City and Asa E. Ramsey, his deputy governor. They insisted that reduction of automobile credit last year was vitally necessary in their territory, not because the automobile business was not essential, but because it already had big credits and other matters were more pressing. Mr. Miller said his bank had just gotten out of debt for the first time in eighteen months and he hoped soon to be able to again rediscount automobile and some twenty other kinds of paper that had been temporarily sidetracked during the pressing need from the agricultural districts. The member bankers have continued to care for their automobile customers.

HOUSES IN ORDER FOR INTENSIVE SALES EFFORT

"The farm trade is certain to be poorer than usual this year. Not alone are crops, raised with higher labor costs, bringing very much lower prices than expected, but many tenants have raised their crops on land rented at high prices, in some cases where the crop will not bring an amount equal to the rent.

"On this three weeks' trip we found that the hysteria in the industry has passed and that the manufacturers and dealers are putting their houses in order and are preparing for a conservative, normal year with intensive sales effort as the high keynote.

"In connection with trucks, we found the dealers somewhat discouraged with present conditions. A slowing down in business has naturally decreased the demand while the open weather has permitted the railroads to carry all the freight offered. In fact, the railroads now report 300,000 idle freight cars.

"Bankers and the far seeing dealers know that the truck business has a fine future which depends somewhat on how soon we have renewed business activity and how soon the program for our much-needed building operations gets under way. The railroads too, will buy trucks for short haul work, which spells brighter days for motor trucks, of which we have less than a million in use."

Reeves will attend a dealers' meeting at Syracuse Friday night and will visit other cities as his time permits.

House Committee in Favor of Appropriation for Road Work

Washington, Feb. 10—A bill authorizing the appropriation of $100,000,000 for Federal aid in the construction of post roads and other highways has been reported out by the House committee on good roads. It further provides for an additional sum of $3,000,000 for national forest roads and trails.

The proposed legislation would allow reduction in the ratio of states where the percentage of total public land area exceeds 10 per cent of the total area of all the lands in the state.

Sales at St. Louis Exhibit Far in Excess of Last Year

Interest of Prospects and Drop in Gas Price Fills Dealers with Optimism

ST. LOUIS, Feb. 11—An exhilarating spirit of renewed optimism, founded on the growing interest of prospective buyers and the recent declines in the prices of gasoline, characterized the sentiment of automobile dealers and accessory men who conducted exhibitions at the fourteenth annual automobile show here this week. Sales for the first three days aggregate over $75,000, according to Robert E. Lee, manager, and exceeds the sales of the same period last year by several thousand.

The great masses who made their way to the show on the opening night were a bit more inquisitive than had been expected. They inquired concerning price, delivery, possible mileage, and everything else of which a prospective buyer desires knowledge. It was a more educated public than that of former shows. The dealer who was there to advance the advantages of his models was not required to explain the purpose of the various mechanical appliances. The average visitor at the show displayed a surprising knowledge of carbureters, batteries, ignition systems, and other details of a motor car.

Special arrangements were made for the entertainment of out-of-town dealers. A gathering was held at noon Tuesday at a down-town hotel under the auspices of the local association. F. E. Moskovics, vice-president of the Nordyke-Marmon Co., representing the National Automobile Chamber of Commerce, delivered an address on "The Automobile Business in General." Short talks were also made by prominent St. Louis dealers and accessory men.

Factory Heads Expected to Attend Show at Charlotte

Charlotte, N. C., Feb. 11—Due to the fact that practically every well known car is distributed throughout the Carolinas from a Charlotte distributor or branch, a great many of the nationally known automobile factory heads are expected in Charlotte for the first week in April at which time the annual automobile show will be held.

The building in which the show will be staged has 30,000 sq. ft. floor space and is of concrete and steel construction. It is much better adapted for show purposes than the one used last year when at least twenty exhibitors were turned away for lack of space. The show is in charge of the following committee: E. M. Wallace, chairman; Fred Anderson and Joseph G. Fitzsimons, and is being staged under the auspices of the Charlotte Automobile Trade Association.

Bankers' Committee in Charge of Finances of Willys Corp.

Willys-Overland Co. Not Involved In Re-Financing Plans of Corporation

NEW YORK, Feb. 10—Financial affairs of the Willys Corp. have been placed temporarily in the hands of a bankers' committee and no bills are being paid except with the consent of this committee. A merchandise creditors committee is being formed with the sanction of the bankers committee and efforts are being made to obtain the consent of creditors for extension of time which will permit of some constructive action. A first preferred stockholders protective committee has been organized and it is understood its attitude to be antagonistic rather than sympathetic toward the bankers.

No Details Available

All the various interests involved are exceedingly reticent as to their plans but it can be stated that reorganization and refinancing of the Willys interests are in prospect although none of the details are available. The subject has been under consideration by the bankers interested for several months. The bank chiefly interested is the Chase National and E. R. Tinker, president of the Chase Securities Co., is a director of most of the Willys units. Walter P. Chrysler, executive vice president of the Willys Corp., is directing the negotiations of the company with the bankers. Associated with him in this work is J. R. Harbeck, who recently resigned as vice president and director of the American Can Co. to devote all his time to his automobile interests. These two men are also directing the affairs of the Maxwell-Chalmers Co.

Definite announcement of the reorganization plan is expected within the next 30 days as many of the corporation's bank loans mature about the middle of March. These loans were renewed at their last maturity date. They are said to aggregate about $20,000,000.

The corporation has a purchase and sale contract with the Willys-Overland Co. providing for the manufacture by the corporation on a large scale of a new lightweight six-cylinder automobile. This contract provides among other things, that the Willys-Overland Co. shall market this car through its sales organization and a special unit organized for the purpose.

RANGER TRUCK HIGHER

Houston, Texas, Feb. 10—Price of the Ranger truck, model TK-22, has been increased from $2,575 to $2,875 by the Southern Motor Mfg. Assn., Ltd.

NEW CLYDESDALE PRESIDENT

Clyde, Ohio, Feb. 10—Frank B. Brown, a director and chairman of the finance committee of the Provident Bank & Trust Company of Cincinnati, has been elected president of the Clydesdale Motor Truck Co., succeeding C. R. Dunbar. Other officers elected by the company, are: Vice-president, C. R. Dunbar, and A. C. Burch; treasurer, W. P. Dodge; assistant treasurer, J. C. L. Krebs, who has been a vice-president; secretary, Homer Metzkar. The board of directors is composed of the officers and J. H. Baynes and Charles H. Bowker of Northampton, Mass. Conditions at the Clydesdale factory are considerably better than they have been. Quite a number of orders are being received for shipments and the inventory is much better balanced than the company even hoped it would be at this time.

First Race of Year at Beverly Hills

LOS ANGELES, Feb. 14—The first championship motor race for 1921 will be run on the Beverly Hills board speedway Washington's birthday. The program will consist of four heats of 25 miles each and a final of 50 miles.

Enrties in the final will consist of winners of first and second places in the first three heats and first, second and third in the fourth best. The total purse amounts to $15,000. Airplane races will be held simultaneously with the speedway events, these including a round trip non-stop race to San Diego. Among those who will participate in the motor races will be De Palma, Milton, Hearne, Sarles, Thiele, Soules, Murphy, Miller and another who will be picked by Duesenberg upon his arrival here.

New President Chosen for U. S. Light & Heat Corp.

Niagara Falls, N. Y., Feb. 10—J. Allen Smith, for many years identified with the U. S. Light & Heat Corp., has resigned as president of the corporation to engage in business for himself. He is succeeded by C. O. Miniger of Toledo, who is vice president of the Willys Corp. and general manager of the Auto-Lite division of that organization at Toledo.

As successor to C. L. Lane, vice president and general manager, resigned, D. H. Kelly has been elected by the board of directors. Mr. Kelly for the past two years has been assistant sales manager of the Willys Light Division of Electric Auto-Lite Corp.

Plans of Goodyear Tire Are Now Ready for Stockholders' Action

After Weeks of Negotiation Agreement Is Reached for Recapitulation and Readjustment

NEW YORK, Feb. 10—The eagerly awaited report of the plan decided upon for the reorganization and refinancing of the Goodyear Tire & Rubber Co. was made public yesterday. It provides for recapitalization and readjustment of the debt and was agreed upon only after weeks of negotiation.

The program will be submitted to the stockholders for ratification at a special meeting to be held in the next fortnight. The adjourned meeting which was to have been held Friday for discussion of the refinancing plan will be deferred again.

There have been persistent reports that when the plan went into effect there would be important changes in the management with the elimination of President Seiberling from active control but official confirmation is lacking. Robert T. Swaine, who is associated with Paul D. Cravath, counsel for the company, says there was no certainty any changes would be made and denied emphatically that any had been decided upon.

Will Be Capitalized

The plan, as agreed to, is a sort of when, as and if issue affair, although it has been assented to by the bankers, the largest creditors and the holders of a majority of the company's common stock. Holders of the existing common and preferred stock will receive like amounts of stock in the reorganized company, except that the shares will be changed to no par value for the purpose of wiping out the existing deficit and of funding 25 per cent of the company's liabilities on merchandise committments, on which specifications and prices have been fixed. Then the company will be recapitalized by the issuance of the following additional securities: Twenty-five million dollars of first mortgage bonds, $25,000,000 of ten-year 8 per cent sinking fund debentures, $35,000,000 of 8 per cent preference stock, $65,000,000 of 7 per cent preferred stock, and 900,000 shares of common stock of no par value.

The bank creditors' committee will try to effect the sale of $25,000,000 of debentures, $35,000,000 of prior preference stock and 256,000 shares of common stock to present holders of the company's stock. Cash realized by the company from that sale will be applied toward the payment of its bank debt and to provide it with new working capital.

6,823 TRACTORS IN PENNSYLVANIA

Philadelphia, Feb. 10—According to estimates of the Pennsylvania Department of Agriculture, the state now has within its borders 6,823 farm tractors. Lancaster county leads, with Chester, Allegheny, Berks, Bucks, Butler, Erie, Montgomery and York following.

Making Better Salesmen by Teaching Service

At the recent sales and service managers' convention of the Eldridge Buick Co., Seattle, practical demonstrations were given of the time and labor-saving equipment used to lower the customer's service costs. It was pointed out at these demonstrations how the salesman could increase sales with a proper knowledge of his company's service equipment

Be Systematic, Service and Salesmen Told at Convention

Over Expansion of Credit Discountenanced and Business on Cash Basis Recommended

SEATTLE, Feb. 4—State wide uniformity of service was the message carried through the first Northwest Sales and Service Managers' Convention held recently in the wholesale building of the Eldridge Buick Co. From the opening day to the close the convention proved itself a dynamic success.

The subject of "Service As it Affects Sales" was covered by George A. Purdy, district sales manager. The valuation of co-operation between the sales and service departments was particularly emphasized. "One sure way of making a favorable impression," said George Purdy, "is to be neat in personal appearance and keep your place of business so clean that everyone who enters is immediately attracted by the clean appearance of your place, as this does much to increase the customers' confidence in you and your methods of doing business." In conclusion, Mr. Purdy called to the dealers' attention the ten commandments for the service man, all of which are original with him.

One entire day was devoted to the practical demonstrations of various uses of the time saving equipment which has been evolved in the Eldridge Buick shop during the past three years and all of which tend to reduce the cost per mile of operation on the customer's car. The foreman of the engine division had a way of injecting a certain spirit into his demonstration. He said: "With our tool equipment we can show you how to make money, make friends, and sell your next year's cars." And he did it. A rear axle demonstration was well staged, also the problems of the starting, lighting, and ignition system of the Buick.

A systematic and uniform plan of adjusting claims was discussed by the claim adjuster. He assured the dealers that practically all parts assembled on Buick automobiles and GMC trucks are subject to a guarantee by the respective manufacturer for a certain length of service.

The traveling parts auditor gave some splendid advice regarding uniformity and well developed parts system throughout the territory. "Every dealer," he said, "should have a parts department and a parts man to look after it. This man should specialize in this work and know everything regarding the parts and should be given the responsibility of everything pertaining to them. A stock card system has been or will be installed in your parts department and must be kept up to date and accurate at all times."

Ralph Wolever, manager of the parts department of the Eldridge Buick Co., also addressed the dealers on the subject of parts. "We have found it possible," said he, "by developing efficient systematic methods of controlling our stock to closely approximate 100 per cent service and at the same time hold down our investment to such a figure as to show a fair margin of profit. The ordering of parts, as you can see, takes a lot of study and is not a hit or miss proposition. Our orders to the factories are written in triplicate. The original copy goes to the factory, the duplicate is filed numerically in this office, and the third goes to the receiving department."

Get a System

The message delivered by Frank C. Cook, treasurer, was this: "If you haven't a system get one and when you get one follow it and do business on a cash basis. Over expanded credit is poor business. Save, invest where you are properly secured, and don't over expand."

There was not one of the men who attended the convention but felt that it was a business getting week for him and his company. So enthusiastic were they all about the message which the Eldridge Buick Co. had so successfully put across during the convention that they wanted it perpetuated year by year.

RESTRAINS WINDSHIELD MAKER

New York, Jan. 28—Federal Judge Hand has granted to Theodore B. Nisbet, John O. Hofbauer and Anton Valerius a perpetual injunction restraining the Perkins Tonneau Windshield Co., Inc., from the manufacture or sale of windshields embracing the claims in a patent granted to Hofbauer in 1912. The court has appointed a commissioner to assess the damages due the plaintiffs under the infringement which the court recognizes.

The Ten Commandments of the Service Man

By George A. Purdy, District Sales Manager, Eldridge Buick Co., Seattle.

1. **I AM THE SERVICE MAN:** I accept upon myself the responsibility of keeping the good will of every owner in our territory. I will not permit him to become dissatisfied and take his car or truck elsewhere for attention.

2. **THOU SHALT** not take the name of a prospect or customer in vain, even though he or she may have ideas very much different from thine.

3. **THOU SHALT** not sit in a customer's car with dirty overalls, or turn the car over to the customer with grease on the steering wheel.

4. **THOU SHALT** always speak in the highest terms of the firm which thou representest and the product it sells.

5. **THOU SHALT** study and improve thy ability and prepare thyself for a job ahead and help the man below to qualify himself for thy place.

6. **THOU SHALT** not steal time, neither from thy employer nor the customer, as time is money.

7. **THOU SHALT** not misrepresent, as misrepresentation leads to loss of confidence, and confidence is one of the essentials of business building.

8. **THOU SHALT** control thy temper, assuming the attitude that the customer is always right, and not allow thyself to become over-familiar with a customer, even though he or she may seem so inclined.

9. **THOU SHALT** be mindful of the fact that the customer has paid well for the services rendered and we can ill afford to allow him to become dissatisfied, as satisfied customers are our best salesmen.

10. **THOU SHALT** love and respect thy fellow workmen and do everything in thy power to encourage co-operation and the carrying out of the policies which are upbuilding to our business.

The service man who keeps these ten commandments will be doing his part in promoting co-operation between the sales and service departments

Will Amend Internal Revenue Act to Prevent Truck Dumping

Situation in Los Angeles Arouses California Congressman to Take Action

WASHINGTON, Feb. 10—Nation-wide protests against the dumping of surplus trucks, sold by the Army to foreign dealers, on American markets have brought about a proposal to amend the internal revenue act at the next session of Congress in order to afford protection to domestic dealers and manufacturers. Congressional leaders believe that this unfair competition may be checked through the enactment of fiscal legislation which would impose a sales tax on trucks and other automotive equipment sold by foreigners or their American agents, to equalize the excise and sales tax levied on local manufacturers and dealers.

English Company Invading Market

The California delegation in Congress has been advised that the Slough Trading Co., an English organization, has taken advantage of customs regulations which permits entry of American-made goods free, to invade the market with several thousand war trucks. Los Angeles dealers assert that prices are inflated for a time until a real prospective buyer appears and attractive discounts are offered which prohibit competition by other dealers. It is further claimed that these former army trucks, remodeled or refinished in British shops, return without imposition of duty as "used" trucks while they are later offered as new.

California congressmen have inquired of the possibility of revising tariff duties but found that the law could not be changed in this respect without meeting defeat as class legislation. Treasury officials thought it would be possible to offset this disadvantage by revision of the internal revenue act when it is called up at the special session next month.

Under existing tariff laws, American dealers and manufacturers are quite helpless to prevent the dumping at cut-rate prices, often below the production costs. The depressive effect of the Anthony "rider" to the army appropriation bill which compells the sale of 10,000 trucks coupled with this latest menace to resumption of domestic sales is expected to bring about unity among dealers and manufacturers in support of proposed amendments to the internal revenue bill. The amendment, if adopted, would undoubtedly provide for the imposition of taxes on these imported trucks equal to the aggregate tax levied on trucks manufactured and sold here in this country. The present Congress will not consider tax legislation but it will be on the calendar for the next session.

LOCAL STORES ADVERTISE SHOW

Sioux City, Iowa, Feb. 10—Sioux City's 1921 automotive and accessory show will open Feb. 14, and will close the evening of February 19, it has been announced by the Motor Trades' Bureau. It will occupy the entire four floors of the new Goodyear building and is being advertised as "Sioux City's Greatest and Speediest Automobile Show."

Sioux City stores are carrying notes of the show in their advertisements and an extensive publicity and poster campaign is being conducted. An effort is being made to secure reduced railroad fares for rural residents who would attend.

St. Louis Salesman Wins Franklin Prize

ST. LOUIS, Feb. 10—A. S. Lyndon of the Franklin Motor Car Co. of St. Louis has been awarded the $500 cash prize offered by the Franklin Manufacturing Co. of Syracuse, N. Y., for the best sales record of any Franklin salesman in the United States. During the contest which was from Jan. 1 to Jan. 31, Lyndon sold and delivered eight cars.

Uniontown Dealers to Stage Their Annual Show in March

Uniontown, Pa., Feb. 11—Preliminary arrangements are shaping up for the second annual automobile exposition of the Uniontown Automotive Dealers' Association. The exact show dates will be determined a little later and will be immediately preceding or immediately following the Pittsburgh show in March. The exhibits will be limited to local dealers entirely because of lack of show space, although many demands have been received from dealers not represented with local branches for space in the exhibit. About 30 members will participate in the show. J. Q. Adams is president, Leo Reed vice-president and George B. Smith secretary, treasurer and publicity representative.

It is understood the National Auto Co. will hold its own display, as last year, in its show rooms here.

Plans of Co-operative Co. to Deal in Equipment Under Way

Milwaukee, Wis., Feb. 10—The United Consumers Corp., organized some time ago by Milwaukee and Wisconsin capital to deal in motor car equipment and supplies on a co-operative basis, has completed plans for establishing seven filling stations as the first series of a chain of gas and oil sales branches. The initial installations will be at Cedarburg, West Bend, Oconto, Waupaca, Portage, Algoma and Kewaunee, Wis. Each will be of solid concrete construction, 14 by 20 ft., with hot water heating plants.

Course in Tractor Operation Planned as Help to Selling

Farmer Through This Training Will Be Enabled to Supply His Own Service

ATLANTA, Feb. 10—What is believed by tractor and power farming equipment dealers and distributors in the Southeast to be one of the most important steps looking toward the further development and expansion of the tractor industry in this section is the inauguration at the state agricultural college in Auburn, Ala., of a six months' course in tractor operation that will cover all phases of repair, service, maintenance and rebuilding, including 300 hours as a minimum for each student in actual field operation. The course is supervised by Prof. M. L. Nichols, head of the agricultural engineering department, with the assistance of Prof. J. W. Randolph.

Will Help Sales

Distributors of tractors in Atlanta, where most of the large manufacturing plants maintain Southeastern headquarters, state that one of the primary objections their dealers meet in the territory is the inability of the farmer owner to operate and care properly for his machine. He is compelled from time to time to pay out money for service to his dealer for the average farmer, the dealers say, does not possess enough real mechanical knowledge to service properly the tractor himself without getting it out of order. The establishment of this course, the first of its kind in any educational institution in the South, will do away with this difficulty and make the merchandising of tractors a more easy matter. Operators graduating from the course will be entirely capable of not only operating tractors properly and getting the very best out of them, but servicing them as well. The course includes lathe work, acetylene welding, a careful study of ignition, tractor rebuilding, and similar subjects which the tractor operator should be thoroughly familiar with. It is open primarily to disabled soldiers, but farmers or any of the students at the institution may take the course if they desire. It is expected to end sometime in July. The federal board of vocational training is also co-operating with the college officials in making the course a success.

ATLANTA FORD BRANCH REOPENS

Atlanta, Feb. 11—In line with the general news of revival of business in all lines in this and other sections of the country, following the recent period of depression, is the announcement by R. S. Abbott, manager of the Atlanta factory branch of the Ford Motor Co., of the resumption of operations at this plant Monday, Feb. 7, on a 50 per cent basis. About 150 men were given employment at the outset. The plant has recently been entirely shut down.

Results of Shows Reflected in Increased Factory Activities

Manufacturers in Cleveland Get Ready for Greater Production to Meet Anticipated Demand

CLEVELAND, Feb. 10—Employment managers checking up on mechanics that have been idle in order to get their present locations, sales managers and their corps of field men putting extra effort into their selling activities, purchasing agents casting about for raw material and preparations being made to increase production are the reflections in the automobile plants of this city of the stimulus that was given the automobile industry by the annual automobile exhibits.

Convinced of Upward Trend

All the automobile making plants in this city had representatives at the New York, Chicago, Cleveland and other shows and these representatives came home convinced that there will be a rebound from the low selling and low production conditions that have prevailed and that the first movement upward is under way.

"The tide has turned and from now on we may be assured that the automobile business will gradually come into normal," said Frank C. Chandler, president of the Chandler Motor Co., upon his return from the Chicago show. "Orders are coming into the factory in better volume than they did in January. January was better than December, and March will be better than February. Later in the year, conditions will be even better and I am optimistic about the record that finally will be written around the present year. I expect to see good business next spring."

Dealer Orders Start Production

Another evidence that makers here are responding to the stimulating influences of the New York, Chicago and Cleveland shows is shown in the announcement from the Templar factory. Daniel L. Britton, factory manager, announced that the force of workmen would be increased 50 per cent within the next three weeks to take care of the increased output. Dealers' orders are coming in such number that larger production is essential. Peerless and Winton both report that increased output is contemplated. Other manufacturing establishments are putting their equipment in shape in order to take care of orders expected when the trade gets into full swing.

One of the hopeful signs has been seen in the agricultural districts of the state. The farmer has been disappointed at the drop in prices for farm products, and especially so when he compared these new prices with prices demanded for the things he must purchase for his farm.

Until the Cleveland show dealers and salesmen sent in reports to their organizations that there was talk from the farmers that they would not buy cars until prices came down to correspond with the reductions made in the price of farm produce. Salesmen have been received better lately in the Ohio agricultural districts, according to reports received by dealers. The farmer who expects to trade in his used car or to dispose of it before buying a new vehicle, has commenced to realize that the longer he holds on to the used car the less he is likely to get for it.

The reduction in the price for gasoline is another factor that has helped to create an optimistic mood in the automobile industry.

Legislator's Plan to Tax Driveaways Will Be Fought

Detroit, Feb. 4—The proposal of Senator James Henry of Lansing to impose a tax of $3 on each car driven from factories over Michigan roads, is meeting with bitter opposition and a determined fight will be made against the bill. Proponents of the measure are not without considerable strength in the country sections, however, and up state legislators are backing Senator Henry's bill.

The author of the measure says continued complaints from authorities that driveaway trains damage the roads prompted the drafting of the bill. The National Automobile Dealers' Association has representatives at Lansing and will lead the fight to prevent the passage of the measure, which will prove a great burden especially on Detroit dealers.

End of Year Shows Large Net Increase in Petroleum Stocks

Washington, Jan. 31—Oil production in the United States in 1920 totaled 443,402,000 barrels, while consumption reached the unprecedented total of 531,186,000 barrels. Despite the excess of consumption over production, the end of the year showed a net increase in petroleum stocks of more than 10,000,000 barrels.

Imports of petroleum during 1920 amounted to 106,175,000 barrels, more than double the imports of 1919 and almost five times greater than the imports in 1913.

Milwaukee Efforts Result in Organizing State Tire Dealers

Milwaukee, Wis., Feb. 7—The Wisconsin Tire Dealers' Association has been organized with a membership of more than 250 dealers, as the result of the extension of organizational effort by the Milwaukee Tire Dealers' Association during the last three years. Officers were elected as follows: President, James Cudlip, Oshkosh; vice-president, Henry O. Stenzel, Milwaukee; second vice-president, V. H. Bosworth, Milwaukee; secretary, Edwin H. Berge, Milwaukee; treasurer, J. E. Thompson, Milwaukee. A second meeting will be held March 15 to adopt a constitution, by-laws and otherwise perfect the organization. The new association has opened temporary headquarters in the offices of the Milwaukee Association of Commerce.

Michigan Authorities Join In Highway Education Move

Conference Called for Feb. 23 Presided Over by Dr. P. P. Claxton of Washington

ANN ARBOR, Mich., Feb. 10—Under the auspices of the permanent committee on Highway and Highway Transport Education, the University of Michigan and the Michigan State Highway Department, a mid-western conference on highway and highway transport education will be held here Feb. 23. The program will be as follows:

Morning session, 10:00 a. m., Auditorium, University Hall; Dr. P. P. Claxton, U. S. Commissioner of Education, presiding: "The Highway and Social and Economic Welfare," by Dr. Claxton, chairman of the permanent committee; "The Educational Activities of the Permanent Committee," by Professor C. J. Tilden, director of the permanent committee; "The Economics of Highway Transport," by Roy D. Chapin, vice-president, National Automobile Chamber of Commerce; "Highway and Highway Transport Education in Secondary Schools," by George C. Diehl, chairman, good roads board, American Automobile Association: "Safety First Education in Secondary Schools," by Harriet E. Beard, Supervisor of Safety Education, Detroit public schools.

Afternoon session, 2:00 p. m., Auditorium, University Hall, Dr. P. P. Claxton presiding: "The Measure of Highway Accomplishment," by Thomas H. MacDonald, Chief, United States Bureau of Public Roads; "The Army's Highway Transport Problem," by Col, Mason M. Patrick, Corps of Engineers, U. S. Army; "The Interrelationship of Waterway, Railway and Highway Transport," by Professor Henry E. Higgs, Professor of Civil Engineering, University of Michigan; "Snow Removal from Transport Routes," by Charles J. Bennett, State Highway Commissioner of Connecticut; "The Economic Value of Highway Transport Surveys," by Professor Arthur H. Blanchard, Professor of Highway Engineering and Highway Transport, University of Michigan.

Dinner will be served in the Banquet Hall of the Michigan Union at 6:00 p. m., Dr. Mortimer E. Cooley, president of the Society for the Promotion of Engineering Education, presiding. After dinner addresses will be "Highway Transport and Industry," by Tom Snyder, Secretary, Indiana Highway Transport and Terminal Association; "Interrelationship of Highway Transport and the Back-to-the-Farm Movement," by A. R. Kroh, Development Department, Goodyear Tire and Rubber Company.

BATES REDUCTION, $255

Joliet, Ill., Feb. 10—Pre-war prices have been restored by the Bates Machine and Tractor Co. of this city, a reduction of $255 being announced.

Concerning Men You Know

W. G. Zahrt, who has been treasurer and assistant general manager of the S. F. Bowser & Co., Inc., Fort Wayne, Ind., has been made vice-president and assistant general manager, the treasurership being filled by D. G. Milligan, assistant treasurer. J. R. Matlack, executive assistant, has been named assistant to the general manager as has R. L. Heaton, who has been director of personnel.

W. L. Laughland has been appointed Watsonville, Calif., dealer by the Bradford Motor Co., San Jose, distributors of the Sheridan car. Gilroy has been assigned to Rowley M. Thomas.

Ernest N. Culver, who during the last three years has been division manager of the Willys-Overland Co., Toledo, in charge of the southern division with headquarters at Atlanta, has been promoted assistant sales manager.

David Rosenbach, formerly president of the Motor Equipment Co. which recently discontinued business, has been appointed general field secretary of the Automotive Equipment Association. He was a jobber for five years, sales manager for the Rayfield carbureter for many years, and for four years was president of the Overland Sales Co.

J. D. Cary has returned to Boston after two years on the Pacific coast and will have charge of the New England branch of the McGraw Tire & Rubber Co.

E. G. Edwards, Chicago, for many years associated with George W. Kellogg, founder of the Kellogg Manufacturing Co., has been elected to the board of directors of the Wayland Specialty Manufacturing Co., Inc., manufacturers of automotive accessories and specialties at Wayland, N. Y., and will become sales manager of the company.

J. G. Melbrod, during the past four years foreman in direct charge of the Titanium Bronze Co. foundry, has made connection with the Hills-McCanna Co., Chicago, and assumed charge of their foundry on Jan. 24.

Hugh R. Corse, for the last six years general sales manager of the Titanium Bronze Co., has become sales engineer of the Lumen Bearing Co., Buffalo, N. Y.

C. A. Norlund, actively associated with the Norlund Novelty Co., manufacturers of the Safety automobile and truck jacks of Williamsport, Pa., for the past seven years as factory superintendent, credit manager, assistant sales manager and secretary, has been appointed director of sales, succeeding Thomas E. Nokes.

C. E. Emory has been appointed sales manager of the Hartford branch of Hares Motors of Connecticut, succeeding Howard D. Graves, resigned.

E. A. Taylor, formerly production engineer of the Pierce-Arrow Motor Co., has been appointed works manager in charge of production for the Liberty Motor Car Co. Before going with the Pierce-Arrow Co., where he was responsible for plant layout and the installation of progressive assembly as well as criticisms of design from a manufacturing point of view, Mr. Taylor was in charge of the manufacturing department of the Cadillac Motor Car Co. for two years and later was in charge of the Maxwell Motor Company's plants at Detroit and Dayton.

W. A. Hamill has been promoted to the post of salesmanager of the Neel-Cadillac Co., Philadelphia, and E. C. Platcher has been named manager of the used car department.

C. W. Reid, manager of the Transportation Bureau of the Federal Highway Council, is dead in New York after a brief illness.

Harter B. Hull, for the past three years department manager for the Sears Automobile Co., Des Moines distributors for Dodge Brothers' Reo, Jordan and Stewart trucks, has severed connections with this firm and has purchased the business of the Peverill Motor Sales Co. at Waterloo, Iowa. The new organization will continue the exclusive distribution of Dodge Brothers' cars in northeastern Iowa, the firm title being the name of the new owner.

Dealers Join With Owners in Promoting Better Roads

Cincinnati, Feb. 9—Automobile dealers and accessory men of Covington, Ky., have joined with automobile owners of that city in the formation of a permanent organization to be known as the Kenton County Good Roads Association. The object of the association will be to obtain better roads throughout Kenton and adjoining counties of northern Kentucky, as well as elsewhere in the state.

Dr. Charles Reynolds, as temporary chairman of the association, has named several committees, on each of which are several automobile men, to make plans for a permanent organization. As soon as the organization can be completed, it is planned to invite dealers and owners throughout all adjoining counties to become affiliated so that the efforts may be strengthened.

VIM PRODUCING NEW TRACTOR

Milwaukee, Wis., Feb. 10—The Vim Tractor Co., which operates its factory at Schleisingerville, Wis., north of Milwaukee, is putting into production a new and larger model capable of pulling three 14-in. plows. It is equipped with a Waukesha motor.

BRIARCLIFFE RACE REVIVED

New York, Feb. 10—The Briarcliffe Race will be revived this year and while no actual date has been set, it is understood that the event will take place in May. The race is under the sanction of the Motor Club which has been absorbed by the Automobile Dealers' Association and E. S. Partridge has been appointed chairman of the race committee. The race will be open to stock cars only and it is expected that this revival of a classic will stir up a good deal of interest as racing has practically come to a standstill in the East since the abandonment of Sheepshead Bay speedway.

Business Better in South, Reserve Governor Declares

Atlanta, Ga., Feb. 12—That business has already greatly improved since the first of the year, inflated credit reduced and is assuming a stabilized condition, and that the present outlook portends better and brighter times for all lines of business throughout the South, is the opinion expressed here in an interview by M. B. Wellborn, governor of the sixth district Federal Reserve Bank.

The opinion is based on a survey of conditions made by the bank official of the Southeastern states comprising the sixth federal reserve district. Mr. Wellborn stated that the deflation period has about passed and that normal conditions are gradually returning.

ROSS HEADS OREGON DEALERS

Portland, Ore., Feb. 11—The Oregon Automotive Dealers' Association at its annual meeting, held in Portland, elected the following officers: President, Homer Ross of McMinnville, last year's first vice-president; first vice-president, Robert Simpson, Pendleton; second vice-president, H. F. Bonesteele, Salem; third vice-president, W. L. Hathaway, Eugene; fourth vice-president, C. E. Gates, Medford; treasurer, Harry C. Hays, Portland; directors, first district, R. B. Miller, Tillamook; director, second district, E. E. Brett, Hood River; director third district, A. S. Robinson, Portland.

Accessory Dealers Not to Be Overstocked During This Year

Philadelphia, Feb. 10—That the United States government is going to build as many roads this year as it has in any three other years and that the motor car industry will benefit thereby, was asserted at the monthly meeting of the Automobile Accessories Business Association by J. H. Collins, who was the speaker of the evening. President W. H. Metcalf presided.

"There will be a good market in the spring," declared Mr. Collins, "but in 1921, for the first time, the manufacturers are going to co-operate with the dealers by not overstocking them. Generally speaking, there is now enough material purchased and in the hands of the manufacturers to keep them going steadily for three months."

Sale of Diamond T Trucks at Less Than List Price Stopped

St. Louis, Feb. 9—A perpetual injunction has been granted in Federal court by Judge Faris to the Diamond T Motor Car Co. of Chicago, restraining Harry Newman, Inc., of this city, from advertising or offering for sale Diamond T trucks at less than their listed price. In the petition for an injunction, it was alleged that the defendants were former distributors of the truck in St. Louis but that their contract was cancelled for good reason and that they were advertising in 25 of the larger cities of the country that they would sell Diamond T trucks at a 35 per cent discount without any intention of making bonafide sales, but with the malicious purpose of injuring the truck company and for the further purpose of forcing the settlement of a law suit then pending. Judge Faris appointed a special master to establish damages and in granting the injunction, declared he never had seen a case "that equals the malice involved in this."

ANNUAL BONUS GIVEN

San Francisco, Feb. 11—The annual bonus has been distributed to employees of the Lou H. Rose Co., Maxwell-Chalmers distributors for northern California. To Rose goes the credit for establishing the bonus idea on San Francisco's automobile row. The first bonus was issued six years ago when Rose first went into business and every year the bonus checks have become larger until now some of the department heads are receiving checks that run into a good sum of money.

A Department of BETTER BUSINESS

Conducted by Ray W. Sherman

Don't Knock Your Own Business

Certain psychological factors enter into the sale of every automobile. In most sales there must be, on the part of the customer, confidence in the car and dealer and a feeling that the car is successful and popular. Now when a dealer puts on a long face and talks to customers about shut-down factories and poor outlooks for sales he is knocking his own business and knocking it hard. He is inadvertently creating in the mind of the prospect an impression that the dealer must have both a poor and an unpopular car. But if the dealer radiates confidence and tells the customer that things are coming along fine and that he has nothing to complain of, the customer will naturally feel that the dealer must have a mighty successful car, a mighty popular car and a car worthy of the most serious consideration. Remember this in all dealings with customers. To knock any part of the automobile business, is to knock your own business.

Drumming Up Trade All the Time

A pair of graduate oil salesmen of long experience who operate a filling station do a big business in oil simply because they do not wait for the business to come in but go out after it. Both men have an extensive acquaintance and buy in large quantities. One week one member of the firm devotes his time to drumming up trade and the other member the next week.

Both are on their toes every minute and are making a record for oil sales. They sell lubricating oil for every purpose and if in the course of a trip they discover that the car user also uses spindle oil—why naturally they endeavor to land the business. Their present stock of goods is sufficient to withstand a long siege.

Find Customer's Note Better Than Credit

A Hartford, Conn., service station does not like to give credit though it does, but not in the usual way. Experience is something of a teacher even to the service station man. This is how the trick is turned. The truck owner comes in for a solid tire or two and when it is time to settle up he wants credit. But the manager of the place tells him very politely that the firm does not give credit but will honor his note. Says the service station manager: "It is really peculiar, but give these fellows credit and they will stretch out the bill over a long period and pay when they get ready. Give them notes to sign and they come in when they are due."

A Bigger Market for Your Ideas

ONE idea in your own mind is one idea. That same idea given to 35,000 other men through the Better Business Department of Motor Age becomes 35,000 ideas.

Ideas help us all. They are the beginning of money-making plans. The smallest good thought may lead to a big result. Just as you are getting the good ideas of others through this department, give them a chance to get square with you by using one of yours. For the trouble of writing the idea Motor Age will send you ONE DOLLAR and you have the satisfaction of having done the industry a service.

Advertising Shows the Home of the Car

More than usual care and thought is devoted to newspaper advertising by Brown, Thomson & Co., Hartford, Conn., Cadillac distributors in Hartford and Litchfield counties. The big idea is a strong personal appeal and it is endeavored to make each advertisement a telling one. From time to time factory copy is used, but in the main the firm localizes its copy. Manager A. C. Rose is now under way with a campaign somewhat out of the ordinary. In conjunction with a telling Cadillac message Rose also incorporates in the advertisements pictures of beautiful residences of Cadillac owners. These pictures are shown at the base of the advertisements, establishing the ownership and location in one size of type with the concluding line "Home of a Cadillac" in large type. Hartford abounds in beautiful homes. The picture of a residence has been more than ordinarily effective in getting the Cadillac message over.

Good Organization Spirit Pays Dividends

When weather permits the employees of the Atlantic branch of the United Motors Service, Inc., have a noon-day picnic dinner on the top of the company's building. There are twenty-seven employees and most of them have the "bring your own" lunch idea. Recently it was suggested that when the weather was nice they all take their dinner together on the roof of the building. Tables were secured and the idea was carried out. The result is well worthy of notice. The spirit of good fellowship prevails and they are just like "one big family." This naturally has a direct bearing on the company's welfare.

Rents Cars During Overhauling

Waterman & Wolf, Inc., New London, Conn., are making a special drive this winter to keep their force busy in general repair work and overhauling of business cars. As an added inducement to claims of superior service and moderate prices, the corporation has provided an adequate fleet of delivery cars for rental to business houses at a nominal price while their regular cars are being overhauled and subjected to needed repairs. Their contention is that many a business house would regularly have their delivery cars overhauled, if they can secure suitable substitute cars and be assured their delivery system would not be interrupted in the meantime.

Terse Sayings from Car Owners

Every time a prospect comes to the salesroom of a dealer, there should be things in the salesroom to help clinch the sale. Of course it is a fundamental requisite of good salesmanship to make the salesroom as attractive as possible. But in addition to this the dealer might hang a lot of handsomely framed cards on the walls of the salesroom on which would appear short sentences from car owners telling why they enjoy driving cars sold by the dealer. Such cards would be a lot more appropriate than the ordinary run of pictures, and, of course, they would have a real sales punch which might go a long way toward helping sales.

10,788

There are 10,788 Flour Mills and Hay, Grain and Feed Dealers in the United States—over three per county. Most of these are in the smaller towns.

This is an excellent example of a business that needs trucks for delivery work and passenger cars for selling.

Show trucks to the mills and passenger cars to the men.

10,788

WHEN they used to talk about the "dusty miller," they meant flour dust. His shoulders were white, and his whiskers too. Nowadays, the progressive miller is more apt to be spotless in his mill, and dusty in his automobile. How many millers are there in your county or counties, who need to enjoy that transformation?

There are 10,788 flour mills in this country, and most of them are in the country districts where they need trucks to handle the incoming grain from the farmers and take the flour and milled feed to the railroad station and back to the farm. Their owners also need passenger cars to get out into the country and purchase grain from the farmers.

Owners of flour mills and hay, grain and feed dealers usually are substantial members of the community. The millers often own real estate including valuable water rights, and of course, the mill itself. Who grinds the flour and sells the feed in your territory?—General Motors Acceptance Corp.

Show Your Customer You Are Careful

A cusomer asks you to drive his car into your shop. He watches every move you make. Drive his car in slowly and carefully. He is well pleased and will permit you to repair his car and will return because he is satisfied. When he knows you are capable of driving a car with proper care he figures you will take just as much pains in servicing his car whereas if you jump in, try his cushions, speed his engine and jerk his car so that it will almost collide with some other car he probably will go somewhere else the next time he requires the service man.—John W. Rowland, Zanesville, Ohio.

Tell Him What Greasing Will Prevent

Every salesman should impress on the customer's mind the importance of having the vital parts of his car, like the transmission, differential, wheel bearings and universal joints, well greased. There have been many instances of burned-out bearings, ground-up gears and worn-out parts that might have been spared had the owner known the importance of grease. It might be well to have in the showroom a table of worn-out parts caused by insufficient oil or grease to show the results.—Edward Wickland, Hutchinson, Minn.

A Tip for the Jobber

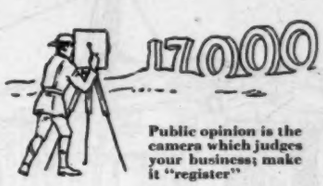
An accessory dealer would be helped materially in his business if the automobile accessory jobber would issue an attractive loose-leaf catalogue that could be kept up-to-date by inserting the new leaves that would be furnished from time to time as prices changed and as new merchandise was added to his stock. This would have a decided advantage over the catalogue that is issued once a year. By the use of the loose-leaf catalogue and the receipt of new leaves all the time the accessory jobber would constantly be kept before the customer.—G. M. Montgomery, Tuscon, Ariz.

Let the Customer Know That He Saves

Few dealers sell a new carbureter unless the old one completely refuses to do the business. Yet many users of old cars could save considerable by having a new carbureter installed that would handle the present grades of fuel economically. An Iowa dealer has sold several dozen carbureters by installing them and taking the saving in fuel until it has paid for itself. Before he removes the old instrument he makes a test run and then does likewise after the new one is in place. In this way the saving can be computed on each gallon of gasoline. Then a card is placed on the gas tank where each gallon that is used is recorded and when the card is filled to the required point the carbureter is supposed to be paid for by the user. In practically every case the user comes in promptly and cheerfully pays the bill. The plan has caused much comment and has been of much advertising value.—S. E. Gibbs, Colfax, Ia.

Lends a Car While His Is Being Serviced

The R. L. P. Motor Co., Philadelphia, has promulgated a new service policy for buyers of new Premier cars in 1921. The company will insure continuous service through the plan of loaning to every 1921 Premier buyer another Premier car every time his car is brought to the R. L. P. station for service. This car will be loaned free of charge, except for oil and gasoline used, and will be in perfect condition.



Proprietors of popular Motion Picture Theatres of good size are prosperous citizens.

There are 17,000 such "Movie Palaces" in American cities and towns, many owned by more than one man.

If these people haven't cars, or if they have machines of old models, they are prospects.

Who are the "Movie Magnates" in your town?

17,000

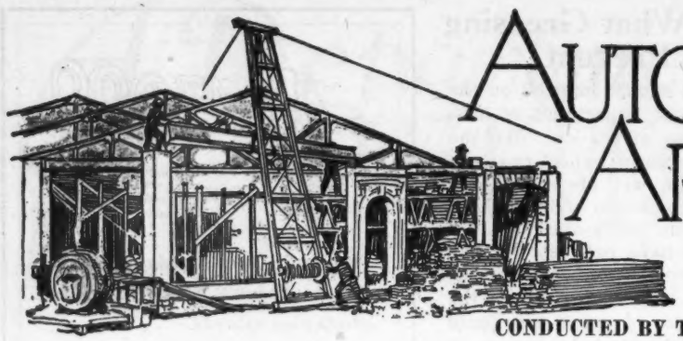
THE motion-picture industry has brought many fortunes into being. Have you had your share? We do not mean have you made a fortune in the "movie" business, but have you shared in the prosperity of those who have, by selling them automobiles?

There are 17,000 motion picture houses of the better class, and the proprietor or proprietors of every one of them have sufficient means to purchase an automobile. Of course, you know all the "movie" houses in your territory, but have you looked up their proprietors lately, and tried to sell them cars?

Don't be satisfied with one call, but call time and time again so that if they do not intend to buy until spring, when spring-time comes they will know you and you can sell them with a final closing talk.—General Motors Acceptance Corp.

Seeks Out Prospects in Selling Tire Pumps

Tire pumps don't seem to move any too well during winter months and this condition has been especially noticeable of late. An Iowa dealer who had about a dozen pumps in stock found a way of reducing his stock to a minimum. He sat down and tried to think of every man that used a pump for other than tire work. His list included dentists, popcorn machine operators, jewelers and others. Then taking a pump under his arm he found many of their pumps in bad condition and made a number of sales. Another dealer in a nearby town was sitting at his desk complaining that nothing was selling while his dentist was having a peck of trouble with a pump and was too busy to go to buy one. —S. E. Gibbs, Colfax, Iowa.



AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

Gravity System for Handling Oil Outside the Building

No. 309

We would be very glad if you could suggest an arrangement whereby we would secure more parking space. We do not handle cars, but specialize on high grade automotive work of any kind.

One point we wish all the enlightenment possible on is the manner in which to handle our lubricating oils. For your guidance at present our oils are handled in 60 gal. steel tanks with pumps similar to the Bowser system. These are kept in our accessory room, but we do not want these tanks in our new room, tanks above the office with pipe lines running down outside, either near curb or front of building, but this complicates the manner of filling tanks and there is more or less leakage with this system.

We thought some of making a recess in the front wall, on one side of drive way, high and deep enough to carry these tanks. These could be covered by a sliding steel door when not in use, but this also has its disadvantages.

If you can figure this out for us it will be of a great help, as we want the oil near the gasoline tank. Owing to our catering to all classes of cars and customers, we are compelled to carry about six different grades of oil.

You will notice our plans call for a fire proof vault. This we desire for several reasons. We shall use this for our major stock of tires and tubes, thereby cutting down our insurance rates and also greatly decreasing the depreciation of tires, due to dirt, grease and sunlight.

As this joins the office, it makes it very simple. The entire partition on side of office to be of brick and concrete extending back to wash rack; the wall separating the shop from main floor, also of brick or concrete. We then have three separate units which greatly reduce fire risks, or at least will prevent losing the entire business, as fire can be confined in one unit.

You may think us skeptical about fires, but we have on east and north sides of us some very inflammable buildings.

What in your opinion is the best material, pressed brick, solid concrete or concrete blocks? If of bricks give approximate number necessary. We would like a flat sloping roof from front to back to be covered with tin or zinc and desire side walls and front to extend somewhat above the roof; all windows to be of plate glass, those on the east side of shop being smaller.

Using office partition wall as pillars, our truss will only need to be 30 ft. which would give us a very stable roof without very expensive truss work.

We would like 16 to 18 ft. ceiling and would prefer metal stamped ceiling for the entire garage, this attaching to bottom of trusses. The space from building wall to curb will be concreted, giving a 6 ft. side walk. On the curb, we would like brick pillars to support some sort of roof over the sidewalk (would prefer glass reinforced with wire), if not too expensive. As we have so much rain here, we want this as a protection for the gasoline pump and by extending 18 in. over the curb, much more convenient driving in rainy weather is made possible.

While we realize this detracts from the appearance of the building, we believe with nice brick pillars and some sort of transparent roof, it will more than offset this by its utility. You might also be able to design a front to give the appearance of many of our filling stations.

If you can give us the quantities of various materials needed, we can more nearly arrive at the cost of building, as we realize that distance from essential materials makes a great difference in the cost.—Leas & Son, Oakland, Ore.

Your plans have been worked out so well to provide for your needs that we feel we are unable to improve the layout enough to pay for changing it. There are quite a number of things about it that we do not approve, but on the whole it is very good and if we were to gain storage space we might eliminate some of your "pet" features.

As you will see from the side elevation of the corner your sidewalk space is going to be quite crowded. As it is only 6 ft. 6 in. wide and has a 12 in. brick pier only 5 ft. 6 in. in actual space is

Automotive Architecture

IN this department MOTOR AGE aims to asist its readers in their problems of planning, building and equipping, service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated, and how large it is expected they will be.

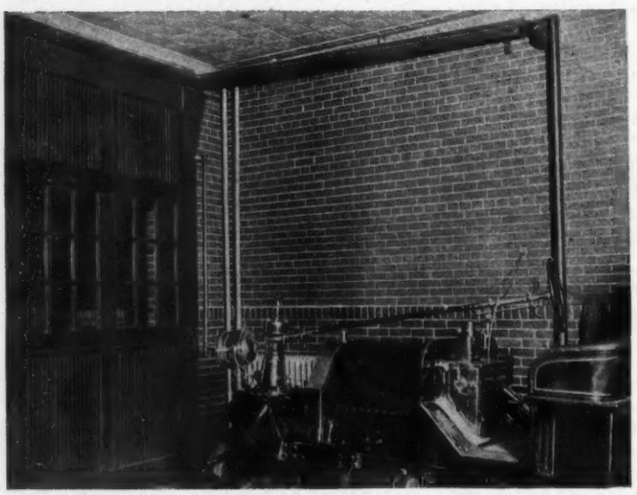
Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

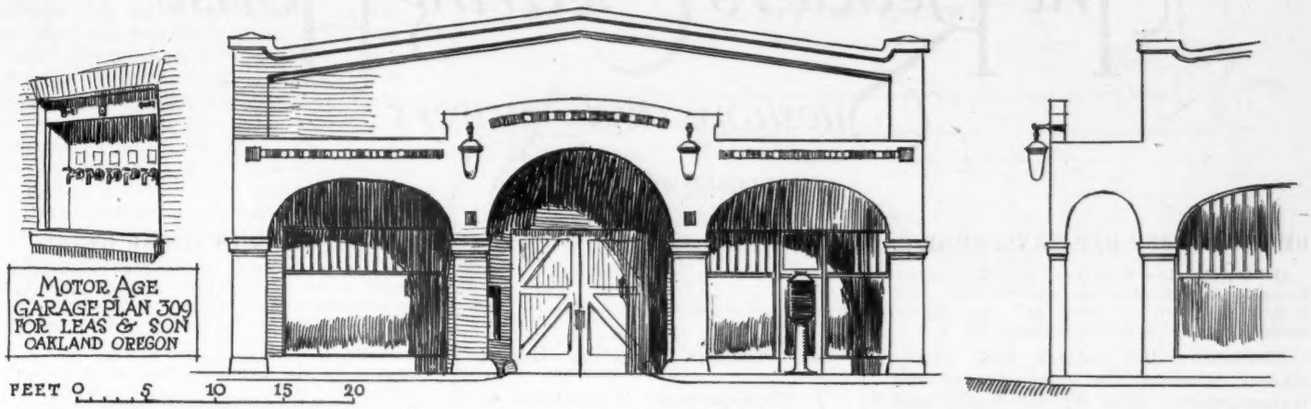
And how much of an accessory department is anticipated.

Garage Door Hanging for Limited Space

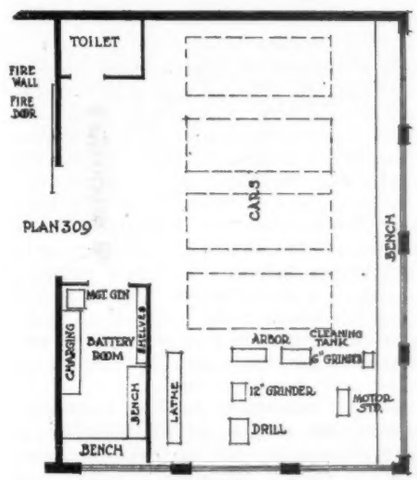


Many times in garage buildings, door hangings are a decided problem; sliding doors have nowhere to slide, swinging doors are too awkward, and swinging folding doors take more from the width of the driveway than can be spared. The "Slydaside" door hanging outfit made by Richards-Wilcox Mfg. Co. offers one way out of the difficulty. Pivoted hangers support the door and run on a track that turns in the corner and runs down the side wall. In this case the mechanism operates so easily that a counter weight opens the door as soon as the latch is released. The device is said to give perfect satisfaction in this fire department where several other door schemes had been discarded and ought to be much simpler to operate with an electric opener than swinging doors

Suggested Exterior for Fire-Proof Sales and Service Station



At the extreme left is shown a method of dispensing oil by the gravity system. The faucets are set in a recess in the wall. The oil is stored in barrels above or wherever convenient and delivered to the faucets by pipes. The side elevation at the right shows the sidewalk would be crowded for space by the use of piers as requested and it is suggested that the canopy be suspended by chains



Plan No. 309

left. Two or three persons standing together would block traffic here and if your city is very strict you might have trouble with the authorities.

If you can spare the space anywhere move the front back 2 or 3 ft., but if not discard the piers and hang your canopy by chains or ornamental iron.

For compactness and convenience there is nothing to compare with the gravity system of oil handling. Six or more taps or faucets could be installed in a wall recess such as we show just to the left of the main entrance or anywhere else for that matter. There should be no waste whatever if a drip pan is provided having a drain leading to a receptacle or series of receptacles. The waste would be so slight that you could let it all run together and when the can is full test it for viscosity putting it back in the barrel it most nearly resembles. As you say the greatest difficulty is in changing the barrels, why not screw a short nipple into the bung and invert the barrel over a receptacle as is done with a water bottle.

When the oil in the receptacle recedes enough to uncover the pipe and admitting air, the oil will flow out of the barrel. A scheme of this sort would avoid all troublesome connections, the barrel merely needing a holder or stone of some sort upon which to invert it after the nipple is screwed in place.

We cannot make an estimate of materials that would be of any value until the detailed plans are complete and it is more than we can attempt anyway, requring quite an outlay of time to make the necessary figures. As soon as you get your plans finished you can get a contractor or two to make bids, or material men will figure the material if you want to be your own builder.

Your intention to have ample fire protection is very wise and will be appreciated by your customers when they leave their cars in your care.

Solid concrete is not a good proposition for walls; brick, hollow tile or cement blocks are better. You can figure seven bricks per sq. ft. of wall area per course. A 9 in. wall of two courses would take fourteen bricks per sq. ft.

When Is a Turntable Desirable?

Turntable installations are, as a rule, not to be desired but in certain places are a great help. In designing a building it is best to so lay it out that a turntable is not needed. The architect should only consider such an arrangement after an absolute deadlock between possible arrangements and desires is reached. Many times it is impossible to place an elevator where it will be convenient on all floors. To make the arrangement satisfactory on the main floor it may be necessary to open on a narrow passage on an upper floor. In such cases, a turntable may solve a problem and it is only at such places that it should be used. Don't deliberately locate or let the architect locate the elevator in an inaccessible position with a turntable on each floor just for the purpose of demonstrating that you are up-to-date and can install expensive equipment. It takes a man several minutes to drive onto a turntable, get out and turn, get in and start on his way. Minutes will grow into hours and weeks and big money, amazingly fast

The Readers' Clearing House

Questions and Answers

CONDUCTED BY ROY E. BERG

Technical Editor, Motor Age.

DISASSEMBLING HUP TRANSMISSION

Q—Outline the necessary service operations to disassemble the transmission and clutch assembly of the 1917 Hupmobile model. N.—N. Larson, Cornland, Ill.

Disconnect the battery and speedometer cable at the right side of the transmission. Take up toe board and disconnect gear shifter shaft from gear shifter rod. Disconnect propeller shaft at front end and remove flywheel housing cover. Unbolt transmission and remove five rear cap screws from oil base to transmission case. The transmission can now be lifted out. To diassemble proceed as follows: The high and low speed sliding gear and reverse idler can be taken out without disturbing clutch or without removing the transmission from the car by simply unbolting sliding gear shaft rear bearing housing and drawing the sliding gear shaft out. Reverse idler gear can be removed by taking out set screw which holds the rear idler pinion in position, removing the pinion shaft and gear.

To disassemble clutch of countershaft gear or bearing proceed as follows: Remove large hexagon nut on front end of the clutch, take out clutch yoke pivot pin and remove the clutch assembly from constant mesh pinion. This gives access to the countershaft nut which has a left hand thread and after removing it the countershaft constant mesh gear can be taken off. Remove the countershaft drive pin, which is through the center portion, and the shaft can be taken out from the front end. In working out the above outlined operations refer to Fig. 2, which shows a sectional view of the clutch and transmission assembly. The above instructions also apply to the 1916 model N units, cars numbers ranging from 60,000 to 87,519.

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

Wiring Diagram 1913 Studebaker

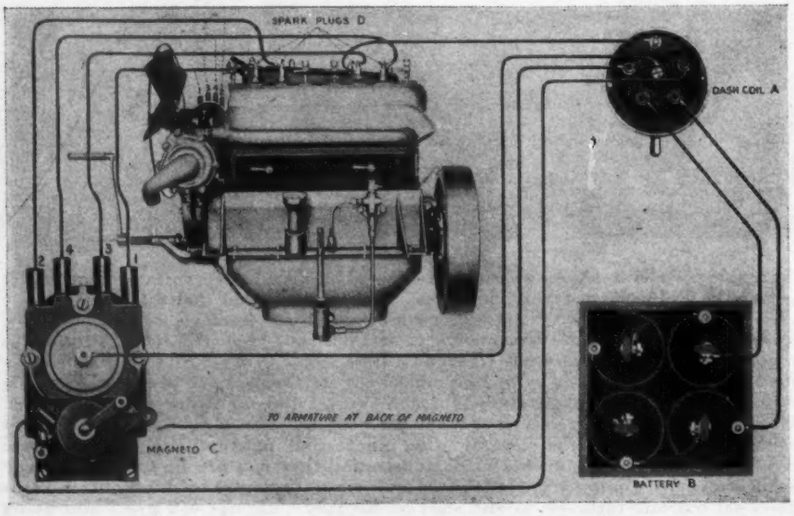


Fig. 1

REMOVING THE TIMING GEARS

Q—At What r.p.m. will a 1916 Interstate model A 4, four-cylinder engine develop its maximum h.p.?

2—Explain how to remove timing gears on this engine and replace with new ones.

3—When pulling under a load the engine hits perfectly but as it picks up speed, it starts to miss, only firing on three cylinders when going about 18 m.p.h. What causes this? Have had new wiring put in and also tried a new carbureter with no better results.

4—Are any cars being made at present with transmission gears in front of differential, having only one universal joint?—Edward Mielke, Chicago.

1—The horsepower of this engine is about 36 at 2200 r.p.m.

2—The gears may be removed by first removing the radiator and then the timing gear housing which will expose the gears. The gears may then be pulled from the shafts and renewed. It will hardly pay to install new gears unless the front main bearing is properly lined up. Many times one will install new gears and the results do not seem to be satisfactory because the gears continue to make a howling sound. This is caused primarily because the wear of the bearings allows the shaft to drop out of line thus causing the gears to operate on other than the pitch line.

3—The indications point to a retarded spark. An engine working under the load of acceleration and having a retarded spark generally displays the characteristics described here. It is possible however that some other cause may be source of the trouble. We suggest that if an advanced spark does not correct the trouble, that you examine the central wire to the distributer. Very often this wire brought up by the distributer is carried part way with the other high tension ignition wires the result being that considerable leakage occurs between this wire which very often also displays these same signs.

4—There are not very many concerns using the rear axle transmission now, Stutz being the only maker adhering to this construction.

BRISCOE WIRING DIAGRAM

Q—Publish wiring diagram of 1916 Briscoe, 4-38 model?

See Fig. 3.

CUTOUT TROUBLE

Q—In a Maxwell with a Simms-Huff electrical system the storage battery will not take charge when generator is showing charge. What is the cause?—Donald Zahr, Ingolls, Mich.

To determine the location of the trouble, start the engine and operate at a speed equivalent to car speed of 20 m.p.h. Turn on all the lights. Then loosen one battery terminal and disconnect. If lights go out or burn dimly,

the trouble is in generator circuit. Keep circuit open only a short while. Do not assume that if this circuit fails to generate that the trouble is in the generator. Trace the generator circuit down from the live connection of the charge side of the ammeter to the junction block, to the cutout to the generator. Since you claim the generator is charging, we are inclined to believe that the trouble is in the cutout. First make sure that the contacts are operating about cut-in speed. Apply voltmeter to ground terminal and generator terminal of cutout. Reading should be about 7 volts with engine running at cut-in speed. Examine the points carefully to make sure that

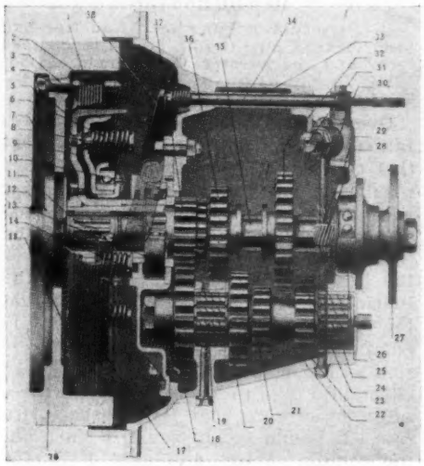


Fig. 2—Sectional view of the 1917 model N. Hupmobile, clutch and transmission assembly

full surface contact is made. There is also a possibility of a partial ground between cutout and battery. It is advisable to examine the battery connections to see that they are perfectly tight and also trace the battery ground connection to see that it is not loose or corroded.

DEFECTIVE CONDENSER

Q—The breaker points of the Westinghouse ignition system employed on the 1915 Hupmobile burn out frequently. Give possible cause for the trouble.—L. F. Weigold, Hartford, Conn.

Continual burning of the breaker points seems to point to a defective coil. The coil used consists of a simple primary winding and a secondary winding with condenser—all embedded in an insulating compound. We advise connecting a new coil and see if this does not correct the difficulty. In determining whether the condenser is at fault the action of the timer contacts should be observed. Excessive sparking is always a pretty good indication of a defective condenser.

STUDEBAKER IGNITION SYSTEM

Q—Publish the ignition wiring diagram of the 1913 Studebaker model 25.—W. J. Apthorp, Burghill, Ohio.

Shown in Fig. 1.

CHARGING FORD MAGNETO

Q—Explain method of charging Ford magneto from a 110 volt D. C. circuit.—Reader, Idaho Falls, Idaho.

A diagram showing the connections necessary in recharging a Ford magneto from a 110 direct current circuit is shown in Fig. 4. You will note that there is a water rheostat in the circuit through which the current must pass before it gets to the magneto.

The path of the return current is through a wire grounded to the frame. The salt water is used as a resistance to prevent a direct short circuit but it does not make it possible to charge the magneto from an alternating current circuit.

Use any kind of metal plates and suspend them in a parallel position about one inch apart as shown in the diagram. A solution of about 4 ounces of salt to one gallon of water will permit a flow of about 75 amp. through the windings of the magneto. The heavy current should be taken at the mains behind the fuses. The current should be applied only for a fraction of a second. If connected too long the heavy current will heat the windings and perhaps do some serious damage.

Before current is applied the magneto should be placed in the proper position. Get a small compass and hold it about level with the insulated terminal in the center of the transmission case about one inch to the left of an imaginary line running through the binding post and parallel to the frame of the car, also holding the compass 5 or 6 in. back from this binding post. The engine is then turned over slowly until the compass registers at a point about one inch to the left of the post. If no compass is available take off the cover of the transmission and after locating the brass studs in the rim of the flywheel, turn the engine over slowly until one of them is about in line with a point about one inch to the left of the binding post. When in this position current can be applied.

Charging Ford Magneto from 110 Volt Direct Current Circuit

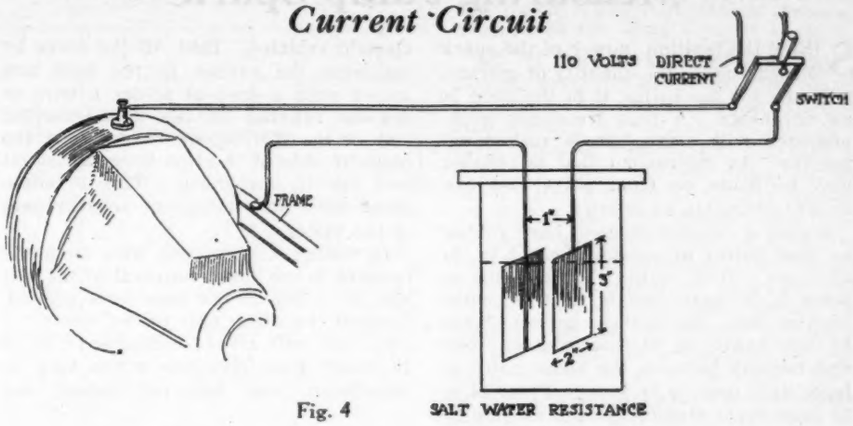


Fig. 4

INFORMATION ON CADILLAC

Q—What is the horsepower of the 1912 Cadillac engine?

2—In good running condition, how fast will it travel?

3—How many miles will it run on a gallon of gasoline?

4—Will a different carbureter work on this engine?

5—What is the clearance between the valve stems and the tappets?—Walter L. Sedlack, So. Omaha, Neb.

1—The S. A. E. rating of the 1912 Cadillac is 32.4 hp. This engine developed a maximum brake horsepower of about 50.

2—In good running condition the car ought to make about 55 m.p.h.

3—With all of the parts in good condition and properly adjusted, you can probably get about 10 and 12 m.p.g.

4—Any of the newly designed carbureters will work on this engine and we advise procuring the names and addresses from the advertising columns in MOTOR AGE.

5—A clearance of from .003 to .004 will give very satisfactory operation.

Wiring Diagram 1916 Briscoe, 4-38

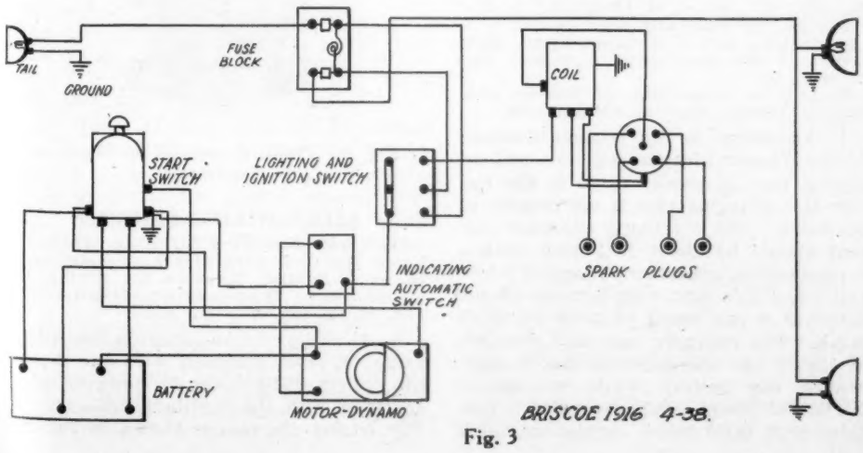


Fig. 3

Measuring Jump Spark

SINCE the ignition power of the spark depend upon the quantity of current, a means for measuring it in the shop is an advantage. A high frequency mileammeter will serve but is rather expensive. An instrument that is reliable may be made up from parts that are easily obtainable as follows:

Secure a circular piece of hard rubber or fiber boiled in parafin about 3 in. in diameter. Drill eight 1/16 in. holes in pairs ⅜ in. apart and ⅝ in. from outer edge of disk. Space these pairs of holes 90 degs. apart. ¼ in. from edge of circle and midway between the above pairs of holes drill four ⅛ in. holes. From 14 to 16 gage sheet aluminum such as may be obtained from an old aluminum body cut strips 3/16 in. wide and 1¼ in. long. Trim one end to a width that will allow it to be pushed through the small hole in the rubber circle. Leave ½ in. of the strip full width.

At points A in the diagram push through the small ends of the aluminum strips and fasten under small wood screws. Cut four similar strips of sheet lead such as may be obtained from old name plates on battery boxes. Push these through at L and fasten the ends. Connect these terminal screws with short pieces of copper wire as to D.C. and A.C. Now make a base of wood 3 in. square of ½ in. stuff. Obtain four rubber caps that screw on the outside of lamp sockets.. Make cups of these of pouring melted battery sealing compound into the small end. Filling the end with asbestos first makes a better job.

Now fit one of these cups over each pair of lead and aluminum strips on the under side of the rubber disk. Cut off the strips until they allow the cups to rest against the rubber or fiber top. Make a borax solution in each cup by first filling it with distilled water, then adding a pinch of powdered borax. Place the four cups upon the base in position so that the circle may be placed upon them putting a pair of the metal strips in each cup. Through the holes at the edge of the circle pass screws long enough to clamp the cups between the circle and the base.

Around the circle even with the top of it and resting upon the base wrap a piece of heavy paper or cardboard leaving a small opening at one side. Through the opening pour melted parafin, also a thin layer on top. The whole forms a Noden valve or rectifier and may be turned upside down without injury. Under a screw at A.C. on each side fasten a wire. Mark this pair of wires COIL. Connect a similar pair at D.C. Mark this pair METER. The whole should be inclosed in a small box and the wires brought out through the sides or cover.

Since the high frequency alternating current is rectified or changed to direct current by the valve it can be measured by any meter of the D'Arsonval type that is sufficiently sensitive. The one most easily obtainable is the Weston used on electric vehicles. Take off the cover by removing the screws in the base and attach with a drop of solder a wire to the one running directly to the moving coil of the instrument. Disconnect the opposite side of the line from the shunt and use it unchanged. This arrangement gives the maximum sensitiveness of the meter.

In testing connect one wire from the rectifier to the spark terminal of the coil and the other to the base or a ground. Connect the other pair to the meter. A good coil will give a deflecion of 15 to 20 small scale divisions which may be considered mile amperes unless one

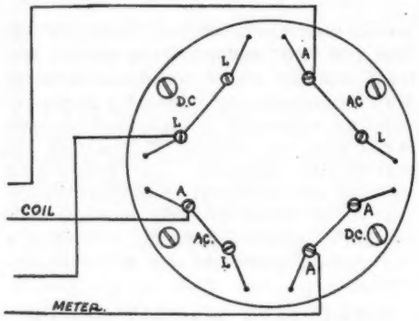


Fig. 5. Diagram of the connections for a rectifier to be used when measuring the jump spark of an ignition coil with a D'Arsonval type meter

wishes to calibrate the meter against some standard mileammeter. The small negative deflection due to the storage battery action of the rectifier may be disregarded being practically constant in each test.

Editor's Note: Very often valuable tests can be made if expensive equipment is at hand but if not guess-work is resorted to. This is particularly true when electrical troubles arise. The rectifier described above is a very clever device that can be easily built at small expense and makes it possible to obtain valuable readings with an instrument of the D'Arsonval type.

STUDEBAKER CHARGING RATE

Q—A Studebaker Six using Wagner generator has a battery charging rate of 20 amp. at a speed of 19 m.p.h. Is that too high for fast and long driving? If the charging rate is governed by the third brush on the commutator how may this be reduced?

2—Publish illustration of Wagner generator.—George Sperling Ashton, Neb.

1—According to the recommendations of the Wagner Electric Mfg. Co., and the setting that is usually made at the factory this charging rate is not considered excessive. The maximum charging current should be about 18½ amp. with a corresponding generator voltage of 8 7/10 volts, and this maximum current should occur at a car speed of from 15 to 20 m.p.h. The charging rate will decrease at higher car speeds so as not to overcharge the battery while touring at fairly high speed. This generator is provided with third brush regulation and if you desire to reduce the charging rate it can be accomplished by moving the position of the third brush.

Moving this brush in a direction of rotation increases the charging rate and, of course, moving the brush in the opposite direction decreases the charging rate. Whenever the brushes are moved they must be reseated in order to insure good commutation. If no trouble is experienced such as frequent burning out of bulbs or rapid evaporation of the water in the battery we do not believe it would be advisable to change the setting.

2—A view of the Wagner generator showing the commutator and brushes exposed is shown in Fig. 6.

OVERHEATING

Q—Briscoe 4-24 runs hot. Radiator has been cleaned out, timing seems to be correct and carbureter adjustment good. What is the cause of it running hot?—T. H. Hewitt, Macleod, Alberta, Canada.

Overheating is often caused by a retarded spark. This is due to the fact that combustion is much lower and as a result the hot gases remain in contact with the cylinder walls a longer period of time. Cut down the mixture of the carburetor and see if this will not reduce the heat to some extent. Examine the lubricating system carefully to see that there is sufficient oil and that it is circulating properly. Check the compression as low compression may have a bad effect. Go over the exhaust system carefully to be sure that the passages are free. It would be advisable to flush out the cooling system and also determine whether the water is circulating properly. Dragging brakes sometimes put enough of a load on the engine to cause overheating but it is only a rare occurrence.

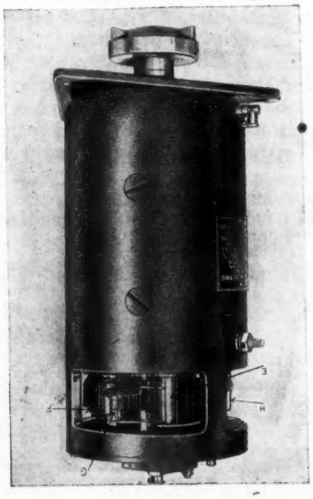


Fig. 6. Pictorial view of the Wagner Generator

ALLEN WIRING DIAGRAM

Q—I have an Allen 35, using Westinghouse ignition, generator and distributer in one. Publish diagram for wiring in an ammeter. It already has a voltmeter. —A. E. Norton, Newton, Kan.

1—According to our records the Allen model 35 was equipped with the Autolite system. The model 37, however, was equipped with the Westinghouse system. The wiring diagram is shown in Fig. 9.

Power Curve of the Essex Engine

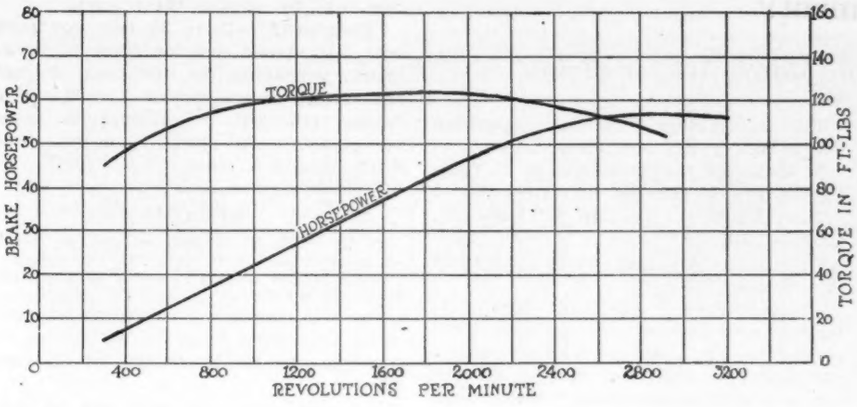


Fig 7

VALVE TIMING

Q—Give valve timing of Essex and Ford engines.

2—Publish power curves of these two engines.—J. A. Glattby, Marysville, Mich.

1—The Essex intake valves open 7 deg. after upper dead center and closes 42 deg. after lower dead center. The exhaust valve opens 55 deg. before bottom dead center and closes 8 deg. after top dead center. The Ford intake valves open .0625 deg. after upper dead center and closes .5625 deg. past lower dead center. The exhaust valves open .3125 deg. before bottom dead center and close at top dead center.

2—The power curve of the Essex engine is shown in Fig. 7 and the Ford power curve is shown in Fig. 8.

ENGINE FAILS TO PICK UP

Q—What is the trouble with a motor or its equipment when it does not respond to the throttle above ¾ open?

2—What is the cause of a Chevrolet 490 car being very hard to start after it has been standing for several hours, car works well, after it is started?—Wolcott Auto Sales Co., Wolcott, Ind., A. P. Bolher.

1—If the engine fails to show a pickup in speed above the three-quarter point on throttle it is probable that there is considerable lost motion in the linkage, if so, butterfly valve will not open fully as it should, therefore, the engine will not pickup in speed. Should you find the butterfly valve fully open when the three-quarter point is reached it will be impossible to get higher engine speed through adjustment of the linkage. We cannot state what speed car ought to make but it is quite possible that 50 m.p.h. is the maximum speed that can be obtained under average conditions.

2—Hard starting is apt to be caused by a combination of several factors rather than just one. It would be advisable to check the ignition system carefully and examine the spark plugs to see that the electrodes have a gap of approximately .020 in.

BATTERIES RUN DOWN

Q—The battery in a model 83 Overland will not hold charge more than about ten days. The charging rate of the generator is about 12 amp., but the car is used very little. Wiring has been checked and is apparently in good condition. Give possible cause and remedy.

Ford Power Curve

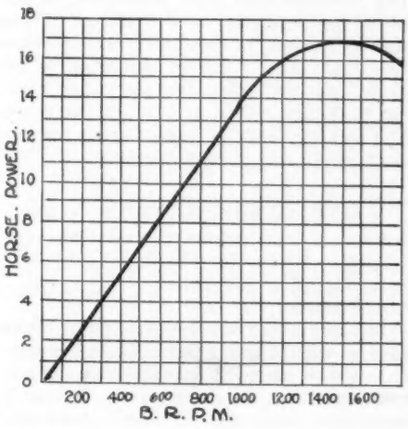


Fig. 8

2—The battery in an early 1920 Dodge will not hold charge more than two or three weeks, usually two weeks. The charging rate of the generator is about 10 amp., but the car is used very little. It is not hard to start. Wiring has been checked from generator to battery, but cannot locate any short circuits. This trouble seems to have always existed and appears to be growing worse. Give cause and remedy.—Lee Bell, 100 W. Fountain Ave., Delaware, Ohio.

1-2—If the cars are used very little it is quite natural that the batteries should run down. If the maximum charging rate obtained is only about 10 amp. it is very probable that during the time of operation there is very little current flowing to the batteries. If the generating circuit has been checked and found in good condition it must be a case of battery trouble. Examine the connectors and be sure they are perfectly tight. If there are internal short circuits the battery may be worn out, the plates warped or perhaps a collection of sediment at the bottom of the cells. There is also a possibility that the plates have become crystalized.

It would be advisable to remove the battery and have it charged from an outside source and then put back into the car. If the trouble still exists you can be sure that there is something radically wrong with the charging circuit. In cases of this kind it is always best to make a careful examination of the cut-out to be sure it is functioning properly.

INCREASING COMPRESSION

Q—What results can be obtained by dressing 1/16 in. off the face of the Ford cylinder head? Would it impair the performance of the engine or would it give more speed and power?—C. Maye, Jonsboro, Arkansas.

Removing a small amount of metal from the face of the cylinder will reduce the compression space and naturally increase the compression. This will result in an increase in power and speed. An increase in compression can also be obtained by installing pistons with a higher crown. The Ford cylinder heads have not always been the same. A few years ago the Ford cylinder heads were not as deep. If one of these older type heads is available it can be installed to advantage if the car is to be used for racing purposes. The compression can be increased to about 70 to 75 pounds by any of the above outlined methods.

Wiring Diagram of the Allen Model 37

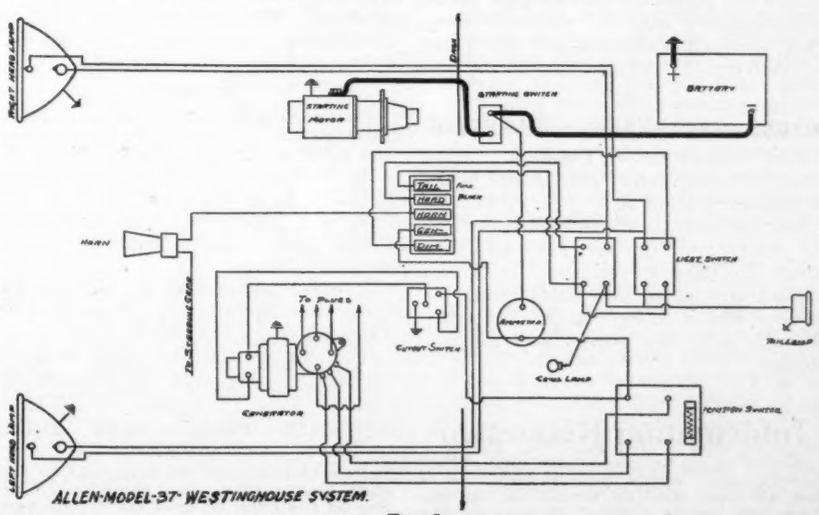


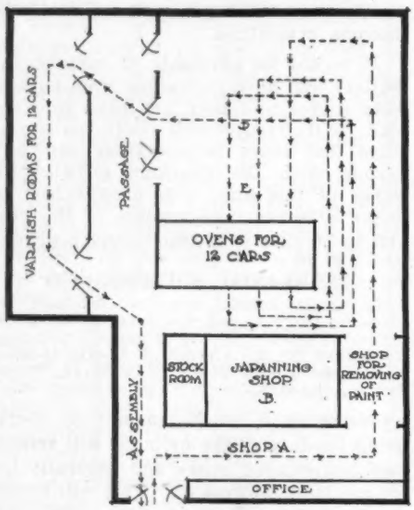
Fig. 9

What Do You Want to Know About a Paint Department?

If it is not on this page write MOTOR AGE *for advice*

Q—I heave read with interest your several articles dealing with the paint department. I am forming a company to operate an enameling plant for automobiles to be equipped with the newest devices and capable of turning out thirty cars a week. The following is an outline of the operations of the plant and upon which I wish to ask some questions.—Reader, Washington, D. C.

The Plan



In the positions marked "C" on the above plan cars receive primer and roughstuff.

In the positions marked "D" on the above plan cars are rubbed.

In the positions marked "E" on the above plan cars are color varnished.

It will be observed that they can be moved into the ovens from any position without moving other cars. No car will be moved by the men doing any painting. It will be either mechanical or done by men employed for that purpose.

Cars are then run into varnish rooms and when dry into the assembly shop. They are then showered and are ready for delivery.

OVENS, JAPANNNING, ENAMELING

First operation: Fenders, lamps, hoods, etc., removed in shop A and placed in japanning shop B.

Next operation: Car mounted on rolling trucks and run on tracks into shop where the paint is removed. It is then washed and rolled into paint shop.

Floor space 21,000 sq. ft. Capacity, six cars pere day except Saturday and Sunday.

Information Requested

Should ovens be gas or electric? What manufacturer would you advise? Is it best to have dry or humid air in the enameling oven? What should be the temperature?

For information regarding japanning ovens and drying equipment address:

H. Gehnrich Co., Brooklyn, N. Y. (japanning ovens, gas and electric).

Paul Maehler Co., 2210 W. Lake St., Chicago, Ill.

Drying Systems, Inc., 11 S. Desplaines St., Chicago, Ill.

Choice between gas and electric is largely a matter of opinion and local conditions. It might be well to consult the gas and electrical companies and compare maintenance costs. Either type will do good work—if you select the gas see that it is of the radiator type, where the products of combustion do not come in contact with the painted surfaces. The temperatures vary according to the work and enamel used. Force drying the body coats is generally done around 100 deg. Any soldered work calls for about 125 deg. Fenders and other similar parts are baked at 275 deg. or more. The baking heat is based upon the desired speed and material used.

PAINT REMOVING FROM CARS

What is the quickest and most effective method? How long should one man take to remove paint from one car? Do you advise the use of caustic to remove paint from fenders?

The best way to remove paint from cars is with a quick action paint remover. Using a good one a man should remove all of the paint from say a 7-passenger open car in about four and one-half hours—this would be for the body, and it would take another hour to remove it from the chassis.

There are a number of alkaline cleaning solutions on the market for removing paint that has been baked on. Ordinary paint remover will not do the work. In rigging up your vats for this work arrange them so that the solution can be heated.

The estimates here given are based upon the performance of an ordinary workman, and a 7-passenger open car. Air drying.

RUBBING

Is this best done by hand or is there a machine for doing it? How long should the rubbing of one car take one man?

Rubbing Roughstuff can be done in from six to seven hours.

Rubbing the second coat of color rubbing varnish can be done in four and one-half hours.

Rubbing the third coat of color rubbing varnish can be done in five and one-half hours.

There is no machine made which can be used for this work on automobiles.

APPLYING PRIMER AND ROUGHSTUFF

How long should one man take to apply each coat? How long should each dry? Should the oven be used for drying same?

Applying primer—30 min. to one hour, depending on type of primer used. Primers ordinarily used require from one to two days for drying (best work).

"Roughstuff"—15 to 30 min. for each coat. It should dry for from 12 to 24 hours, depending on thickness of coat and nature of the work. The use of a drying room will cut down these rates appreciably. All coats can be force dried in such a room.

SPRAYS

It is intended to use sprays as much as possible. What make do you recommend? What operations can they be effectively used for?

For information regarding sprays write De Vilbiss Mfg. Co. of Toledo, O., and Paasche Air Brush Co., of Chicago, Ill.

For refinishing, the spray can be used in your japanning rooms, and you can also use it effectively on all chassis work if you will rig up a booth for the work. It can also be well used for painting trucks.

For chassis work the spray gun will handle all coats, and a much more heavy bodied varnish can be used. It is not suited for refinishing body work on account of the difficulty in protecting the upholstery, etc. Nor is a spray gun suited for applying the finishing varnish on even stripped bodies on account of the danger of laps and runs. These defects do not show so plainly on the chassis as they do if on the panels.

COLOR VARNISHING

How long should one man take to varnish one car? How long should it dry in the oven?

Color varnish can be applied to the body in about two hours for each coat, and the same for the chassis. A 24 hour color varnish should dry out in the drying room in about six hours.

FINAL FINISHING

Would you advise a separate room for each car? How long should they be heated? How long should they stay in the varnish room?

If the enameling process differs from the above will you please consider the question applying on enameling?

If you are going to build a finishing room to hold twelve cars it would be better to divide it off into suitable units so that work that was dry could be removed without interfering with any work that might be going on. If it were but one large room cars should not be run in or out while a job was drying. A job should be allowed 24 hours in the finishing room for drying—that is, for the average varnish.

The finishing room is best heated by radiators, thermostat controlled, or by hot air that has been properly conditioned before entering the room.

The means to use in heating the air entering the paint room, if this method of heating is chosen, should be a source of dustless air. Do not have air intake near any place where dust is constantly created. Neither should it be located near a smoke stack, for on damp days much soot is apt to be drawn into the paint room.

Adjusting the Fordson Clutch

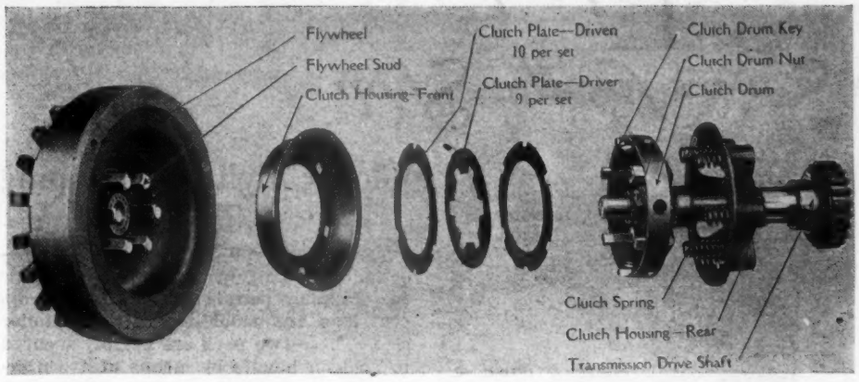


Fig. 10. Diagram showing the parts of the Fordson clutch in their relative assembling position

Q—The clutch of a 1918 Fordson tractor slips. Two extra disks were installed but this remedied the trouble only for a short time. Heavier springs have also been installed but the slipping continues. What is the probable cause and how can it be remedied?—Ernst Bacon, Roseville, Ill.

The clutch needs little or no attention unless it develops a tendency to slip when pulling under heavy load. In many cases this is caused by the operator riding with his foot on the clutch pedal, the weight of his foot being sufficient to relieve a little of the tension on the spring. The only remedy for slipping is to remove the clutch from the tractor and make the necessary replacement of parts. Oftentimes slipping can be remedied by installing an extra large plate to replace the thickness of the other plate which has been lost due to wear. The Ford company recommends the use of a 150 lb. pressure spring. An extra plate should not be used with these springs as the clutch will drag and cause wear.

The clutch may be removed for the purpose of replacing parts in the following manner: Remove the engine from the rear part of the tractor. This can be accomplished by the following operations: Drain the oil from the crankcase. Empty radiator and water jackets by opening the small cock under the radiator. Close stop cocks on sediment bulb and gasoline tank and remove the fuel tank. Remove the air washer and gasoline tank, disconnect the steering arm of the draglink and the control rods from the commutator and vaporizer. Remove the dash by unscrewing the four cap screws holding it to the transmission housing. Jack up the transmission housing and the engine separately, being careful to prop up the radiator to the front axle so as to prevent the engine from tilting over when it is disconnected. Remove the bolts from the cylinder fans holding the engine to the transmission housing.

The rear part of the tractor can then be drawn away from the engine as shown in Fig. 11. When this is completed remove the nut on the end of the driveshaft which holds the clutch in place and pull the clutch off. The clutch can then be taken apart by removing the eight bolts holding the front and rear housing together. In assembling oil the plates well and be sure they are replaced in their proper order; that is, driving and driven plates must alternate and the two end plates must be driven plates. When replacing the clutch on the driveshaft be sure the slip ring is in its place and that the clutch drum fits over it properly. Fig. 10 shows the clutch parts in their relative assembling position.

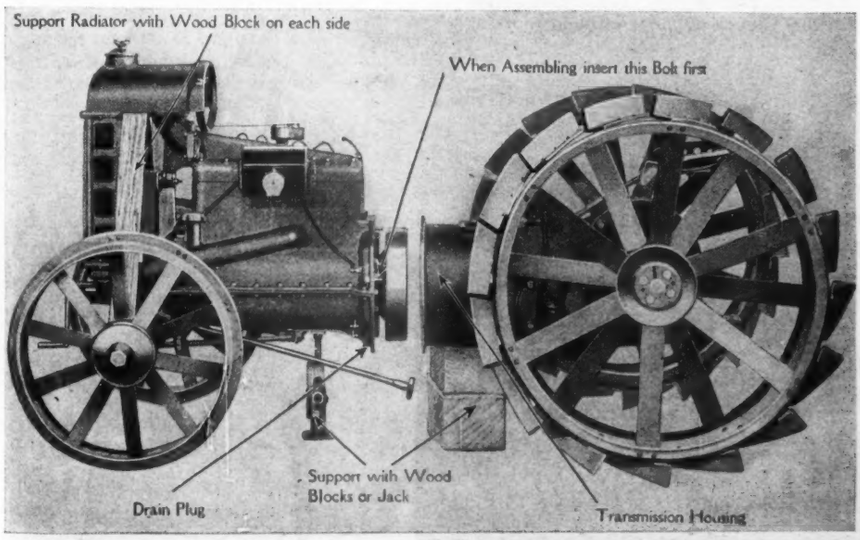

Support Radiator with Wood Block on each side
When Assembling insert this Bolt first
Support with Wood Blocks or Jack
Drain Plug
Transmission Housing

Fig. 11. View showing the method of supporting the parts of the Fordson tractor when it is split for the purpose of disassembling the clutch

FORD HEADLIGHTS

Q—When overhauling the wiring of a Ford car we installed 2 9-volt bulbs in the headlights and a 16 volt bulb in the taillight all connected in series. The taillights would burn but the headlights would not. If shorted through the taillight socket and headlights would burn but as soon as the bulb was replaced headlights would not burn. What is the cause?—Raymond Haskins, Bowling Green, Ohio.

The Ford magneto generates about 18 volts. If a series multiple circuit is used the headlights are wired in series and should have two 9 candle-power bulbs. It is important that bulbs connected in series be of the same amperage as otherwise one bulb will be liable to burn out. Difference in bulb size is undoubtedly responsible for the trouble when they are connected as explained in the question. Fig. 12 shows how the system may be wired and the proper size bulbs used.

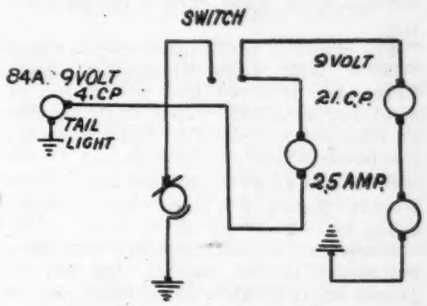


Fig. 12—Diagram of series-multiple connections to be used in wiring the lamps of a Ford car

BACK LASH

Q—How can back lash in th drive shaft of a Jeffery Chesterfield Six be eliminated?

Back lash may be caused by worn universals or worn parts in the rear axle assembly. It is also possible that the hoisting is loose. As to the rear axle adjustments the service department of the Nash Motors Co., states that the worn drive is not supposed to be adjustable. When the gears are placed in the proper alignment no attention is necessary other than to keep the ball bearings well lubricated. Any movement resulting from wear can only be eliminated by the substitution of new parts. In case the outside of the rear axle housing becomes loose, screw up on the retaining ring in the rear of the housing until a tight joint is obtained. Lock the ring with the small screw when the proper adjustment is secured. If the universal joints are worn it will be necessary to replace them as no adjustments are provided. Before attributing the trouble to the rear axle it would be advisable to check over the condition of the transmission and clutch.

Service Equipment
Time Savers for the Shop

Howard Shear Attachment

A tool that can be attached to ordinary slip-joint or combination pliers has been put on the market by the Waterloo Specialty Mfg. Co., Waterloo, Iowa. This shear attachment will cut medium gage metals including tin, galvanized iron, sheet copper, brass, zinc, etc., and is claimed to cut to the very point of the blades. The blades are of steel ⅛ in. in thickness and 2½ in. long.

Running-in Stand

To run-in rebuilt engines, after installing in the car, is the purpose of a stand designed and built by the F. B. Smith Co., 36 Pyatt Street, Youngstown, Ohio.

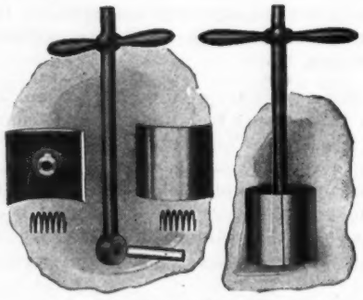
The stand is made up of two 3-wheel Weaver jacks from which the wheels have been removed and a stiff leg of steel rod attached. Two 12-ft. lengths of I-beam are welded to these jacks on the points where the lift-bearings of the jack originally were. At the ends of the I-beam planks are used for a short ramp.

When the engine assembly has been completed in the chassis, the car is placed on this table. The front end of the crank shaft is connected by a driveshaft to the 35 hp. electric motor. The table can be raised or lowered by the jacks at either end, to give perfect alignment of the drive shaft to the crank shaft. After a sufficient time the car is removed from the table and the starter applied.

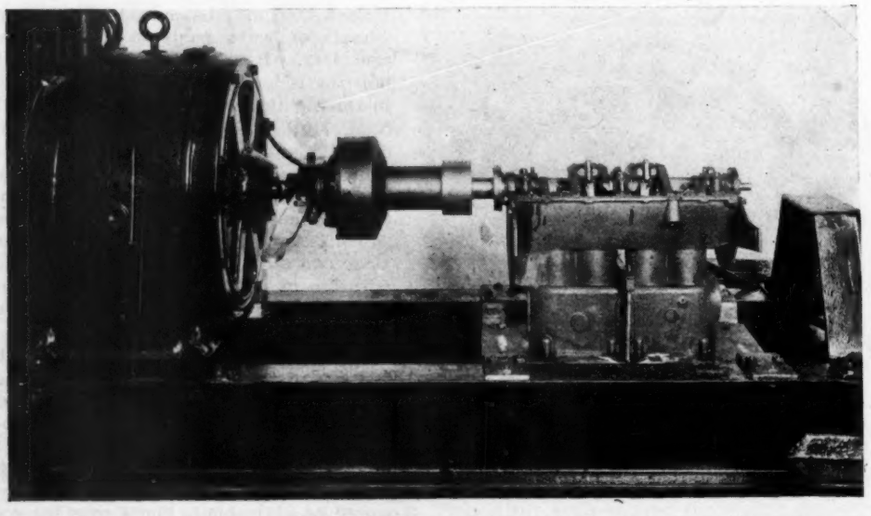
The advantages claimed are that the stiffness is worked out of the reassembled engine in a short time, with no danger of scoring cylinders; it prevents

Guarantee visible pump

running down a battery by a mechanic in futile efforts to start a stiff engine; these same mechanics will be working while the engine on another job is being smoothly and efficiently run-in by electric power. The standard can be used for running-in separate engines or by a special bracket, for testing out rear axles and universal joints, without removing the car from the table.



Clover cylinder lapping tool



F. B. Smith running-in stand

Clover Cylinder Lapping Tool

The Clover cylinder lapping tool for cylinders 3¾ in. in diameter consists of two lapping pads made of close grain cast iron and machined to the cylinder size. These two pads are flexibly secured to an iron handle by means of a centering pin and are kept in an expanded position by two springs which, according to the manufacturers, insures constant pressure against the cylinder walls during the lapping operation. Depressed areas are provided on each lapping pad to receive the surplus accumulation of lapping compound and to redistribute it. By means of a cross handle the tool may be used for hand lapping and in addition, the lug, turned true with the driving pin, provides means for chucking the tool in a drill press or portable electric drill for power lapping—Clover Mfg. Co., 950-75 Main St., Norwalk, Conn.

Guarantee Visible Pump

The essential feature of the 5-gal. gasoline container of the Guarantee pump is a sliding central tube and five 1-gal. measure stops. In other words, 1, 2, 3, 4, or 5 gal. as required can be measured automatically. This container at top of the pedestal is of glass, protected by a guard of expanded metal. The frosted glass globe contains an electric light bulb. A vacuum line extends from the top of the container down through the pedestal to the pipe from the intake end of the rotary pump. Quarantee Liquid Measure Co., Rochester, Pa.

Howard shear attachment

The Accessory Show Case

New Fitments for the Car

Woolwine Canteen

This combination consists of three canteens, one for water, one for oil and one for gasoline, clamped in a holder which is fastened to the running board. The front bar of the holder frame is hinged and can be easily opened to remove the canteens when necessary. One bar of the holder and the handles of the canteens are provided with adjustable rubber cushions to avoid rattling. Each canteen is provided with a faucet which makes it convenient to fill the crankcase or gasoline tank directly from the canteen. The canteen for water has a spout which makes it very convenient for filling the radiator. Woolwine Metal Products Co., Los Angeles.

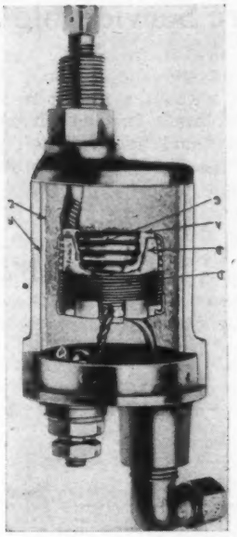
Apco Shock Absorber

This shock absorber for Ford cars is made in two types only, one which is adaptable to the touring car, runabout and couplet, and the special type for the sedan and light delivery car. Side sway with this shock absorber is said to be eliminated by a patented side link. The spring is made from ½-in. wire, 4½-in. in diameter. The castings are all malleable iron and the bushings are of hardened steel. Direct suspension with a large conical spring is a feature of the Apco. $20 for a set of four. Apco Mfg. Co., Providence, R. I.

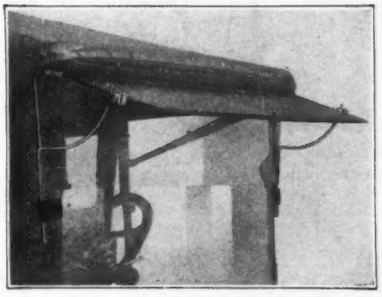
Presto Visor

The Presto storm and glare visor is designed to keep the snow and rain from the windshield, and to shut off the glare of headlamps at night and the sun in the daytime. The bracket and support of this visor can be used on either open or closed cars and is adjustable to different widths to suit the different models. It is claimed not to interfere with the opening of the windshield or the putting up or down of the top. It is made in three models, and the price for all models is $7.50. Metal Specialties Mfg. Co., Chicago.

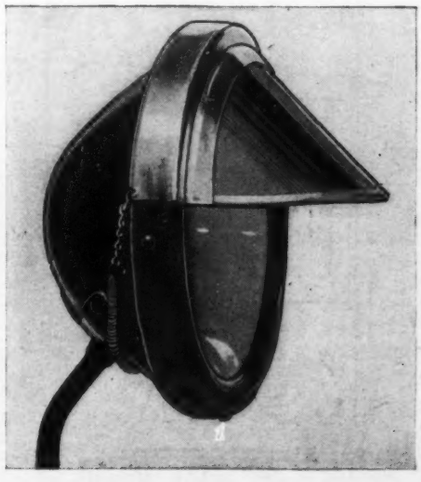
Apco shock absorber



Hot gas petrolizer



Presto visor



Patton glare stop

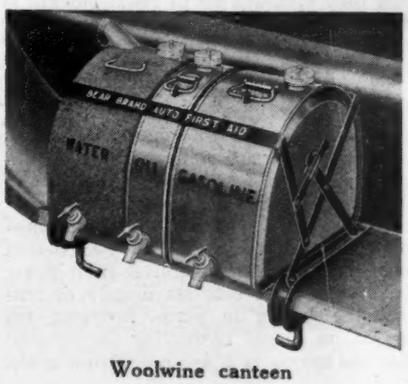
Patton Glare Stop

This is a patented device consisting of a visor of pyralin with aluminum frame rounded to fit segment of lamp and held firmly in place by steel wire spring. It can be placed at any angle desired, but 5 deg. is recommended for best results. Instead of dimming the driving light, this device forms a shade or hood that prevents glare by intercepting all upward rays, concentrating the light on the road, it is claimed, for 100 ft. ahead. It is made in sizes to fit all makes of cars, and priced at $4 a pair. Patton Glare Stop Corp., 741-741 Santa Fe Avenue, Denver, Colo.

Hot Gas Petrolizer

An electrically operated hot gas petrolizer which is claimed to make possible the injection directly into the intake manifold any volume of hot gaseous fuel, has been recently developed by the G. V. Van Buren Co., 522 Fifth Avenue, New York City. The essentials of this petrolizer are: A heating unit 3 in. long which is threaded into the intake and which communicates by a copper tubing dash injector which in turn connects with the fuel lines. There is a switch and a small safety light which indicates when the heating unit is in operation and when it is not. In operation the driver pulls a switch which permits current to flow into a resistance coil. This resistance coil surrounds a coiled section of tubing through which gasoline is permitted to flow when the injector is operated. In from 10 to 20 sec., according to manufacturer's claims, the gasoline in the tubing is raised to such a temperature that suction of the injector forces it out into the manifold in the form of hot gas.

A noteworthy feature of the petrolizer is that engine suction is not depended upon to draw hot vaporized fuel into the engine. This device sells for $19.50 complete.



Woolwine canteen

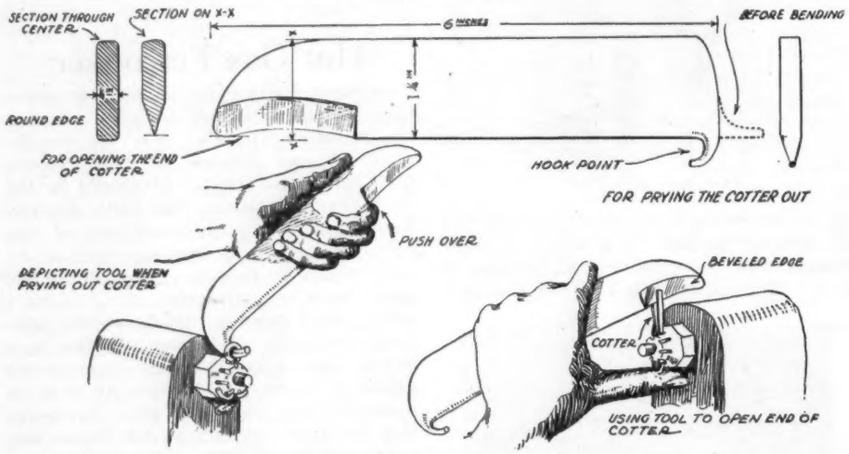
The Automotive Repair Shop

Practical Maintenance Hints

Large Cotter Pin Tool More Serviceable

Usually the cotter pin tool is a small tool not much larger than a pencil, in consequence the repairman is more apt to extract the cotter with a pair of pliers, mainly because these afford a good grip.

A really serviceable tool for pulling and laying the ends of cotters can be made from the following specification. This tool is about 1¼ by ¼ in. at the grip, 6 in. long, with a side hook with a beveled edge at the opposite end. The side hook feature is a decided improvement over the usual button hook type of cotter tool, in that the hook is placed into the eye of the cotter and the tool pushed offside and pulling the cotter right out without stopping to straighten up the points. Instead of pulling the cotter as usual and taking chances on skinning the knuckles the cotter is pried out as though the tool were a crowbar. The advantage of the handle is apparent in laying the ends of cotters after inserting. Cotter pins try the patience of many mechanics. Follow the dimensions in the sketch and either make one yourself or turn the job over to the blacksmith.



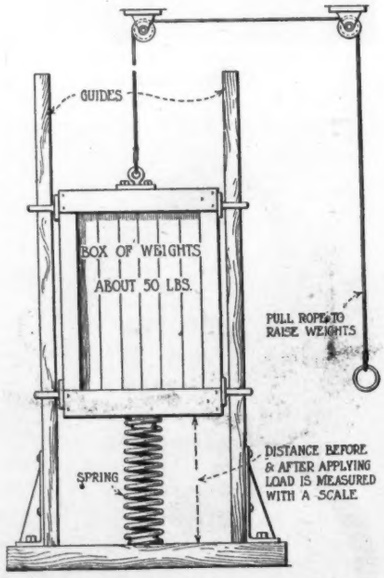
A cotter pin tool made in the dimensions indicated above will prove a time and patience saver

Valve Spring Tester

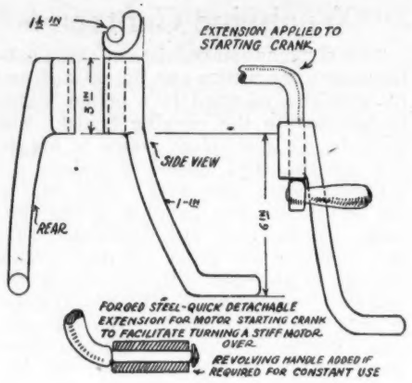
When the valve spring is suspected of weakness a rough and ready method of determining whether this is so or not is to pry the coils apart with a screwdriver while the engine is running and note whether this improves the operation of the engine.

A more accurate method and one which is also of use in testing new springs before they are installed just to make sure that they measure up to requirements is to weight the spring, that is, to apply a certain weight to it and measure how much it is compressed thereby.

The amount differs with every spring, but careful service station men find that it pays to get this information from the factory. There are many types of weighing devices, but perhaps the simplest and cheapest consists of a weighted box running in guides with a mounting underneath for the valve spring. The weight of the box and the material in it being known, the test consists merely of putting the spring in place, lowering the weight on it and measuring the amount that the spring is depressed with a scale.


GUIDES
BOX OF WEIGHTS ABOUT 50 LBS.
PULL ROPE TO RAISE WEIGHTS
SPRING
DISTANCE BEFORE & AFTER APPLYING LOAD IS MEASURED WITH A SCALE

Apparatus for testing strength of valve springs


1¼ IN
EXTENSION APPLIED TO STARTING CRANK
SIDE VIEW
REAR
FORGED STEEL-QUICK DETACHABLE EXTENSION FOR MOTOR STARTING CRANK TO FACILITATE TURNING A STIFF MOTOR OVER.
REVOLVING HANDLE ADDED IF REQUIRED FOR CONSTANT USE

Crank Extension for Starting Stiff Engine

After overhauling an engine and tightening the connecting rod and crankshaft bearings, it is advisable to jack up the rear wheels and start the engine, permitting it to run several hours before taking it out of the garage. Starting the engine with stiff bearings is difficult and if the bearings are made desirably tight even a starting system will not crank the engine over. Under these conditions an extension to the starting crank lever of 6 in. or more will permit of turning the stubborn engine over and start it.

In the sketch a forged steel handle extension is shown which is adaptable to practically any starting crank. The shape of this part is shown below and as made is attached or detached readily without requiring tools. This extension is also useful in turning the crankshaft while the work of tightening the bearings proceeds. While the handle is shown as a solid part of the extension, for constant use in the repair shop, a loose handle from an old starting crank can be used in place of this.

Putting on a Cutout by Welding

Instead of sawing a hole in the exhaust pipe when putting on a cutout, use a torch with an excess of oxygen and cut the hole out. Weld the cutout in place at two or three points and it will stay. Put the pedal where it is not in the way when removing floor boards. With the torch, blow a hole in the steel floor back of the floor boards (on Fords) and weld the cutout pedal down. Fill the gas tank first so that no explosion can occur. In this way it will not be necessary to uncouple the chain or cord each time the floorboards are removed.—Meridian Garage, Arlington, S. D.

Law in Your Business

By Wellington Gustin

Tell Us Your Legal Problems

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted to him.

Transfer of Number Plates

I have been doing repair work on automobiles and am thinking of starting in buying and selling of second hand cars, and ask your advice as to the proper way and proper kind of license to apply for from the Secretary of State so that I may be able to transfer it from one car to another and still be within the law. As you know it may become necessary to transfer it two or three times in a single day. The Whipple Repair Shop, Chicago.

We think you would come under the designation of dealer and as such should apply for and receive dealer's registration. Application blank will be furnished by the Secretary of State at Springfield. The rate is $12 a year. Duplicates of number plates are furnished upon payment for each set of two plates the sum of $12 a year. Such number plates shall be conspicuously displayed upon the front and back of every motor vehicle of the dealer when the same is operated or driven on the streets or highways.

Upon receipt of your verified application the Secretary of State will assign you a general distinctive number for all the motor vehicles owned or controlled by you. You must give the secretary the trade name or names of the make of the motor vehicle or vehicles dealt in by you, also the character of the engine power and the amount of such engine power stated in figures or horsepower.

With such registration you may transfer your number plates from one car to another at will. Upon the sale of a car the dealer must give the purchaser a bill of sale setting forth the name and address of the purchaser, date of purchase, together with a description of such motor vehicle showing name of manufacturer, style, factory and engine numbers, and amount of horsepower.

Legal Responsibility

"A" has been in the garage business for a number of years working on all makes of cars. He meets "B" who offers him the job of overhauling his (B's) car. "A" gets the car, puts it in his garage, has the engine reground and other things done to the amount of $110. While "A" is out of town his garage burns down. The garage is partly covered by insurance. "B" demands of "A" that he put the car in the condition it was in when received. The car does not carry insurance. Can "A" sue "B" for the amount invested in repairs on this car, or is "A" liable to "B" for damage to car by fire? "A" had signs posted to the effect that he would not be responsible for damage by fire or theft.—Walter Miller, Lackawanna, N. Y.

A may sue B for work and repair on B's car, if he was not responsible for the destruction of the car by fire. If the negligence of A caused or contributed to the loss of the car by fire, then A may be held liable to B.

One may not be relieved of his legal responsibility for negligence simply by the posting of signs to that effect.

Recovery Under Insurance Policy

Referring to our insurance policy covering property damage, would like your opinion as to what you think would strengthen our case should we decide to sue for payment of damage to car caused by the presence of an elevator shaft. I do not want to place this in the hands of an attorney unless I am reasonably certain that recovery under this policy can be had.—A. R. Stone, Omaha, Neb.

I have gone over your policy carefully and I am of the opinion that the clause 4 of Condition A, reading: "(4) suffered by any person through the existance of any elevator, escalator, moving platform, or other hoisting device not described in statement 5 of the schedule," applies to the endorsement covering the liability "for damage to others in charge of the assured."

You will note that endorsement No. B E 70557, is subject "to all the conditions, agreements and limitations of the policy, as originally written."

It is expressly stated that the policy does not cover loss from liability under Clause (4) Condition A and I am of the opinion that it was the intention of the insurance company to avoid loss "through the existence of any elevator," etc. Therefore, the question resolves itself into one of fact, whether the loss was suffered through the existence of any elevator. The question here arises whether the elevator shaft is included in the expression "existence of any elevator."

It is a rule of law that a policy of insurance is construed most strongly against the insurer, and since the exception sets out specifically "any elevator, escalator, moving platform, or other hoisting device," there is the question whether it was within the contemplation of the parties to exclude damages arising from the existence of an elevator shaft.

This is a rather novel proposition to me and I have no cases on same. While first I thought that clause (4) Condition A, was against recovery by you, I now am of the opinion that you have a fighting chance under the policy. Perhaps if you can get a satisfactory settlement that would be the wise plan to follow.

All Parts of Stolen Car Need Not Be Identified

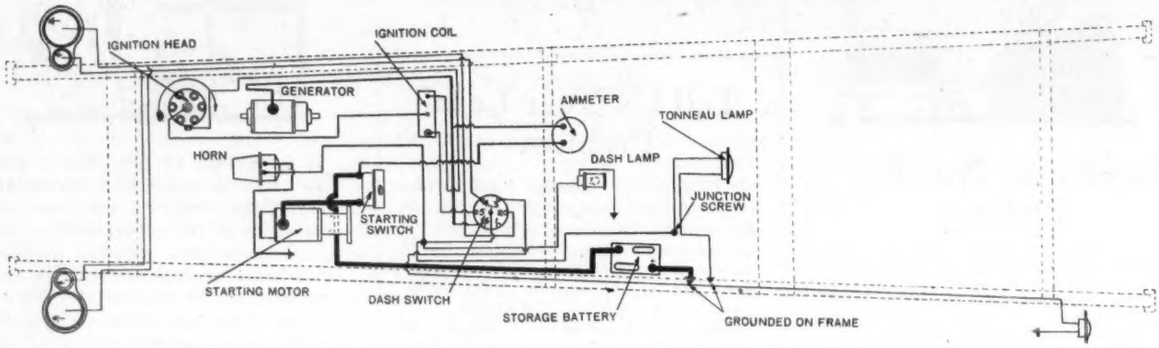
IN the case of Wald against Auto Salvage & Exchange Co. the plaintiff sought to recover his stolen car. He claimed that the numbers on the engine and machinery had been ground off, and some of the figures changed by a chisel. He offered to identify by other means than numbers. His car had been stolen upon the streets of Des Moines and passed through many different hands before located in Kansas City. He identified the two rear wheels of the stolen car by rope marks and knife cuts but the rest of the car to which they were attached were not his. Returning to Des Moines he sought to buy a second-hand car, and ran upon a run-about having one of the front doors of his stolen car. In looking at other cars at the second-hand shop he ran onto another car that looked like his except that the wheels had been changed. Many minute details were noted proving and identifying his car.

The Supreme Court of Iowa said, in the action whereby the claimant replevined his stolen automobile from a dealer, where the numbers were ground off and other figures substituted, it was competent to identify by other means, such as marks, scratches, and other peculiarities if such circumstances sufficiently identify.

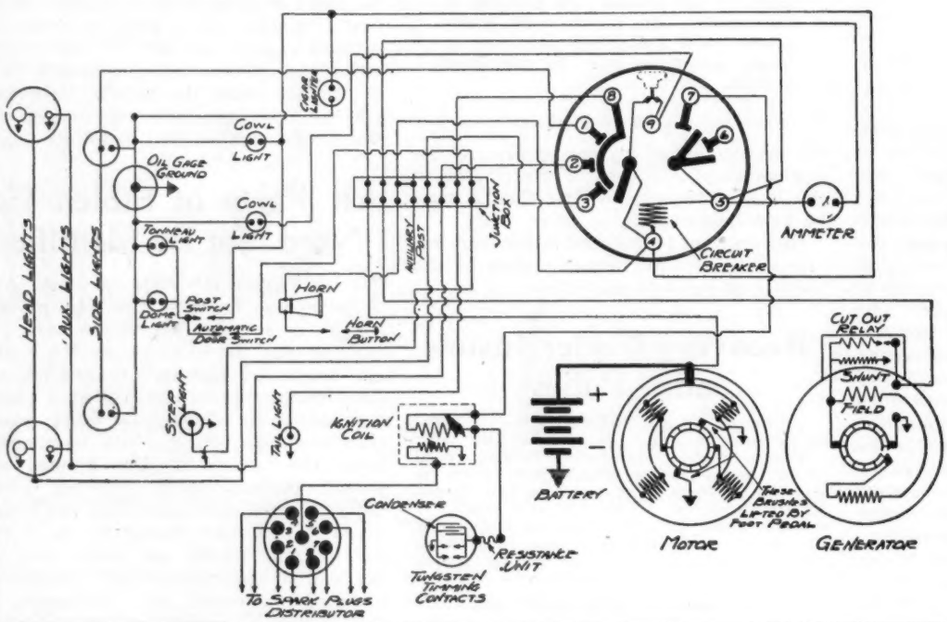
Again it was said where some of the parts had been exchanged with those of other cars, after the discovery of the car in defendant's possession, the action to recover becomes one for the car's value, and the claimant need not show that all the parts of the car identified in defendant's possession were parts of his car.

Motor Age Weekly Wiring Chart No. 116

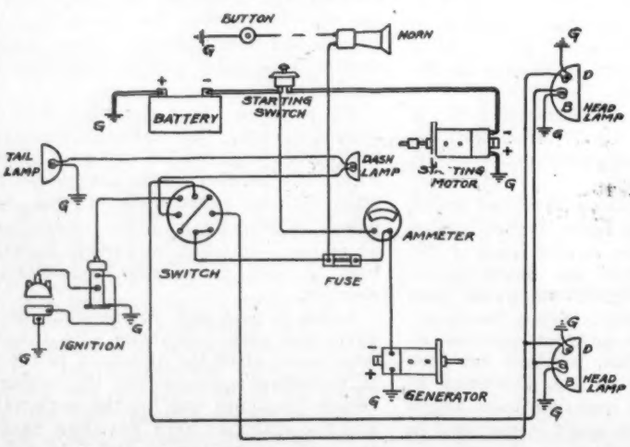
1920 Case—Westinghouse and Delco System



1920 Daniels—Delco System



1920 American Beauty—Westinghouse and Atwater Kent



Name of Car and Date on Which Wiring Diagrams Have Appeared in Previous Issues

Allen—June 17, '20
Sept. 30, '20
Auburn—Sept. 9, '20
Apperson—Aug. 5, '20
Buick—July 15, '20
Dec. 23, '20
Cadillac—Nov. 18, '20
Case—Aug. 5, '20
Oct. 7, '20
Chalmers—June 17, '20
Cole—Dec. 9, '20
Jan. 6, 21; Jan. 20, '21
Crow-Elkhart—July 29, '20
Davis—Aug. 12, '20
Dorris—Dec. 9, '20
Dort—Aug. 12, '20
Dodge—Sept. 23, '20
Elcar—Oct. 28, '20
Dec. 2, '20
Elgin—Oct. 14, '20
Franklin—June 3, '20
Franklin—June 3, '20
Dec. 2, '20
Grant—Aug. 12, '20
Nov. 25, '20
Harroun—July 15, '20
Haynes—June 24, '20
Hudson—Jan. 13, '21
Hupmobile—Feb. 3, '21
Jordan—June 10, '20
July 22, '20
Kissel—Aug. 19, '20
Oct. 21, '20
Lexington—July 29, '20
Dec. 16, '20
Locomobile—June 3, '20
Mitchell—Jan. 6, '21
Moline-Knight—July 22, '20
Nov. 4, '20
Moon—July 29, '20
Aug. 19, '20
Moore—Nov. 11, '20
National—Dec. 16, '20
Oldsmobile—Sept. 16, '20
Nov. 25, '20
Dec. 23, '20
Packard—Oct. 7, '20
Peerless—Nov. 18, '20
Pierce-Arrow—July 15, '20
Feb. 10, '21
Premier—Feb. 10, '21
Reo—July 22, '20
Feb. 10, '21
Roamer—Dec. 30, '20
Feb. 10, '21
Saxon—Sept. 9, '20
Oct. 21, '20
Dec. 30, '20
Scripps-Booth—Aug. 26, '20
Feb. 3, '21
Sheridan—Feb. 3, '21
Stearns—Nov. 4, '20
Jan. 13, '21
Stephens—Sept. 16, '20
Studebaker—July 1, '20
Oct. 28, '20
Velie—Jan. 20, '21
Willys-Knight—Oct. 14, '20

Additional Wiring Diagrams May Be Found in the Readers' Clearing House in This Issue

Windshield Glass Sizes

FOR PASSENGER CARS—Coupe Models

Motor Age Maintenance Data Sheet No. 137

One of a series of weekly pages of information valuable to service men and dealers—save this page.

Name and Model	Upper Glass				Lower Glass				Remarks
	Height	Length	Thick-ness	Curved Plate?	Height	Length	Thick-ness	Curved Plate?	
Allen, 43	Do n	ot bu	ild C	oupe					
American, C60	Do n	ot bu	ild C	oupe					
American Beauty	Do n	ot bu	ild C	oupe					
Anderson, S40	10½	38¼	¼	No	7¾	35¼	¼	No	
Auburn, 6-39	10 1/16	41⅛	¼	No	7⅜	41⅛	¼	No	
Bour-Davis, 21	Do n	ot bu	ild C	oupe					
Brewster	All B	rewst	er bo	dies	are c	usto	m ma	de	
Briscoe, 4-34	10½	36½	¼	No	10½	36½	¼	Yes	
Buick, 1921:									
3-pass	10	40	7/32	No	8	40	7/32	Yes	
4-pass	12	42	7/32	No	8	42	7/32	Yes	
Case, V	12	40	¼	No	7¾	38¾	¼	No	
Chalmers, 35B & C	10 7/8	39	5/16	No	7⅛	39	5/16	No	
Chandler	Do n	ot bu	ild C	oupe					
Chevrolet, FB	11	35¼	7/32	No	Outsi	de vi	sor		
	10	35¼	7/32	No	7¼	35¼	7/32	No	
Cleveland, 40	11	39	¼	No	Outsi	de vi	sor		
	9¾	39	¼	No	7¾	39	¼	Yes	
Climber, S	Do n	ot bu	ild C	oupe					
Cole, Aero 8-870	12	37½	5/16	No	Outsi	de vi	sor		
	11⅛	37½	5/16	No	5¼	37½	5/16	No	
Columbia Six	10	40	7/32	No	7½	40	7/32	No	
Commonwealth, 45	Do n	ot bu	ild C	oupe					
Cunningham, 59A	10	42	¼	No	12	42	¼	....	
Daniels, D19	12	50½	5/16	No	6½	46½	5/16	No	
Davis	10	42	5/16	No	8	40	5/16	No	
Dodge Bros	12 5/8	38 5/8	7/32	No	6	38 5/8	7/32	No	
Dort, 15	10½	40½	¼	No	8⅛	40½	¼	No	
Dixie, H, S7000	8	38	5/16	No	10	38	5/16	No	
Dorris, 680	9	38¼	¼	No	5	38¼	¼	No	
Essex, A	Do n	ot bu	ild C	oupe					
Ferris, C21	Do n	ot bu	ild C	oupe					
Franklin, 9B	9 11/16	25	5/16	No	7⅝	25¼	5/16	No	4 pieces
Ford, T	9 11/16	37 5/16	¼	No	9 11/16	37 5/16	¼	No	
Gardner, G	Do n	ot bu	ild C	oupe					
Geronimo, A45	Do n	ot bu	ild C	oupe					
Grant	11¾	34	5/16	No	6	34	5/16	Yes	
Hanson	Do n	ot bu	ild C	oupe					
Haynes, L. Six	12 7/8	42	7/32	No	Outsi	de vi	sor		
	9⅝	42	5/16	No	6⅝	41	5/16	No	
Holmes, 1921	15	43½	¼	No	6	43½	¼	Yes	
Hudson, 110	12⅝	43 1/16	5/16	No	6⅜	42⅝	5/16	No	
Huffman, R	Do n	ot bu	ild C	oupe					
Hupmobile, R5	10	41	5/16	No	6⅞	41	5/16	No	
Jordan, M, Brougham	15¾	47⅞	5/16	No	6¾	43⅝	5/16	No	
La Fayette, 134	10 9/16	39 1/16	5/16	No	5⅞	39⅝	5/16	No	
Leach Biltwell	Do n	ot bu	ild C	oupe					
Liberty, 10C	11¼	38⅛	¼	No	7¼	38⅛	¼	No	
Locomobile, Land	12 5/32	43¾	3/16-7/32	No	11 7/16	43¾	3/16-7/32	Yes	

Name and Model	Upper Glass				Lower Glass				Remarks
	Height	Length	Thick-ness	Curved Plate?	Height	Length	Thick-ness	Curved Plate?	
Lorraine, 21T	Do n	ot bu	ild C	oupe					
Maibohn, B	Not i	n pro	ducti	on a	s yet				
Marmon, 34	10 7/8	41 3/16	5/16	No	7 11/16	36½	5/16	Yes	
Maxwell, 25	9¾	39 7/16	7/32	No	7 1/16	39 7/16	7/32	No	
McFarlan, 147	....	....	....	....	....	....	....	....	
Mercer, Series 5	Do n	ot bu	ild C	oupe					
Meteor, R & RR	Do n	ot bu	ild C	oupe					
Metz, M, Six	9 5/16	38 5/8	¼	No	9¼	37¼	¼	Yes	
Mitchell, F40	11	21	¼	No	6⅞	21	¼	No	4 pieces
Monroe, S9-10	Do n	ot bu	ild C	oupe					
Nash, 681-2	10	38 5/8	¼	No	7 5/16	38 5/8	¼	No	
National Sextett	13½	38	5/16	No	8	37¼	5/16	No	
Nelson, E	Do n	ot bu	ild C	oupe					
Norwalk, 430-KS	Do n	ot bu	ild C	oupe					
Ogren, 6-60	Do n	ot bu	ild C	oupe					
Oldsmobile, 37A	9¾	34	7/32	No	7⅛	32	7/32	No	
Olympian, 45	Do n	ot bu	ild C	oupe					
Overland, 4:									
First 5,500	10	34 5/8	5/16	No	8	34 5/8	5/16	Yes	
After 5,500	10	34 3/8	5/16	No	8	34 3/8	5/16	Yes	
Packard, 335	10¾	39 5/16	5/16	No	8 11/32	37¼	5/16	Yes	
Paterson, 650	10¼	39½	¼	No	7½	39½	¼	No	
Peerless, 56, S6	9⅝	39¼	5/16	No	.....	39¼	5/16	No	
Piedmont, 4-30	Do n	ot bu	ild C	oupe					
Pierce Arrow, 31 & 51	11 5/16	36¾	¼	No	8⅝	36¾	¼	....	
Pan, A	Do n	ot bu	ild C	oupe					
Porter, 46	Close	d car	s are	cust	om m	ade			
Premier, 6D	Do n	ot bu	ild C	oupe					
Premocar	Do n	ot bu	ild C	oupe					
Ranger, B	Do n	ot bu	ild C	oupe					
Reo, T6	.....	35⅝	.....	.....	.....	32 11/16	.....	.....	
	10	32¾	5/16	No	7¾	30½	5/16	No	
Revere, Series F	Do n	ot bu	ild C	oupe					
Rock Falls, 12	Do n	ot bu	ild C	oupe					
R. & V. Knight	10	40	5/16	No	7	40	5/16	No	
Saxon, 125	Do n	ot bu	ild C	oupe					
Scripps Booth, B39	9⅜	38	7/32	No	8	38	7/32	No	
Seneca, 120	Do n	ot bu	ild C	oupe					
Skelton, 35	Do n	ot bu	ild C	oupe					
Studebaker, EJ	10¾	39	7/32	....	7⅝	39	7/32	....	Landau Roadster
Studebaker, EH	11	40½	¼	....	7⅛	40½	¼	....	
Templar, 445	8½	33¼	¼	No	8¼	33¼	¼	No	
Texan, A, B-38	Do n	ot bu	ild C	oupe					
Velie, 34	Do n	ot bu	ild C	oupe	on t	his c	hassi	s	
Velie, 48	11 15/16	44 5/16	5/16	....	4 29/32	44 5/16	5/16	....	
Westcott, C38	13¼	38⅞	5/16	No	7¾	35¾	5/16	Yes	
Winther, 61	Do n	ot bu	ild C	oupe					
Winton, 25	9⅞	40⅛	5/16	No	7 5/16	38 1/16	5/16	No	
Wasp, 2011	Do n	ot bu	ild C	oupe					
Westcott, C48	Do n	ot bu	ild C	oupe	on t	his c	hassi	s	

COMING MOTOR EVENTS

Automobile Shows

Hartford, Conn.	Annual Automobile Show	Feb. 12-19
Kansas City, Mo.	Annual Automobile Show	Feb. 12-19
Fitchburg, Mass.	Automobile Show	Feb. 12-19
Winnipeg	Western Can. Automotive Equip. Show	Feb. 14-19
Holyoke, Mass.	Automobile Show	Feb. 14-19
Sioux City, Iowa	Automotive and Accessory Show	Feb. 14-19
Worcester, Mass.	Annual Automobile Show	Feb. 14-19
Charleston, W. Va.	Annual Automobile Show	Feb. 14-20
Trenton, N. J.	Annual Automobile Show	Feb. 16-19
Ottawa, Ill.	Automobile, Truck and Tractor Show	Feb. 17-19
Streator, Ill.	Annual Automobile Show	Feb. 17-19
San Bernardino, Cal.	Annual Automobile Show	Feb. 18-28
Albany, N. Y.	Annual Automobile Show	Feb. 19-26
San Francisco	Automobile Show	Feb. 19-26
Pittsfield, Mass.	Annual Automobile Show	Feb. 20-26
Grand Rapids, Mich.	Automobile Business Association	Feb. 21-26
Louisville, Ky.	Automobile Show	Feb. 21-26
Deadwood, S. D.	Annual Automobile Show	Feb. 21-26
Salt Lake City	Automobile Show	Feb. 21-26
Paterson, N. J.	Annual Automobile Show	Feb. 21-26
Elmira, N. Y.	Annual Automobile Show	Feb. 21-26
Manchester, N. H.	Annual Automobile Show	Feb. 21-26
Amarillo, Tex.	Annual Automobile Show	Feb. 22-24
Springfield, Ohio	Annual Automobile Show	Feb. 22-26
Poughkeepsie, N. Y.	Annual Automobile Show	Feb. 22-26
Saginaw, Mich.	Annual Automobile Show	Feb. 22-26
Galesburg, Ill.	Annual Automobile Show	Feb. 22-26
Malone, N. Y.	Annual Automobile Show	Feb. 23-26
Warren, Pa.	Annual Automobile Show	Feb. 23-26
Clinton, Iowa	Sixth Annual Automobile Show	Feb. 23-26
Newton, Kan.	Annual Automobile Show	Feb. 23-26
Bloomington, Ill.	Automobile and Tractor Show	Feb. 23-26
Buffalo, N. Y.	Annual Automobile Show	Feb. 26-March 5
Binghamton, N. Y.	Annual Show	Feb. 28-March 5
St. Joseph, Mo.	Automobile Show	Feb. 28-March 5
Muskegon, Mich.	Automobile Show	Feb. 28-March 5
Duluth, Minn.	Annual Automobile Show	Feb. 28-March 5
Portland, Me.	Annual Automobile Show	Feb. 28-March 5
Columbia, S. C.	Annual Automobile Show	March
Uniontown, Pa.	Annual Automobile Show	March
Quincy, Ill.	Automobile Show	March 1- 5
Wilmington, Del.	Automobile Show	March 1- 5
Wichita, Kan.	Annual Automobile Show	March 1- 5
Des Moines	Open Car Show	March 2- 5
Brooklyn	Automobile Show	March 5-12
Atlanta	Automobile Show	March 5-12
New Haven, Conn.	Annual Automobile Show	March 5-12
Atlantic City	Annual Automobile Show	March 5-12
Pittsburgh, Pa.	Annual Automobile Show	March 5-12
Des Moines	Enclosed Car Show	March 7-10
Indianapolis	Automobile Show	March 7-12
Springfield, Mass.	Annual Automobile Show	March 7-12
Scranton, Pa.	Passenger Car Show	March 7-12
Syracuse, N. Y.	Automobile Show	March 7-12
Nashville, Tenn.	Annual Automobile Show	March 7-12
Wheeling, W. Va.	Annual Automobile Show	March 10-11
Pendleton, Ore.	Annual Automobile Show	March 10-12
Richmond, Va.	Automobile Show	March 12-19
Newark, N. J.	Automobile Show	March 12-19
Boston, Mass.	Annual Show	March 12-19
Omaha, Neb.	Annual Automobile Show	March 14-19
Washington	Annual Automobile Show	March 14-19
Greenville, S. C.	Automobile Show	March 16-19
Detroit	Annual Automobile Show	March 19-26
Torrington, Conn.	Annual Automobile Show	March 20-26
Ottumwa, Iowa	Annual Automobile Show	March 23-26
Chattanooga, Tenn.	Annual Automobile Show	April
Charlotte, N. C.	Automobile Show	April 4- 9
Bridgeton, N. J.	Annual Automobile Show	April 2- 9
Gloversville, N. Y.	Annual Automobile Show	April 3- 9
Seattle	Annual Automobile Show	April 4- 9
Buffalo	First Ann'l Motors and Sportsmen's Show	April 11-16

Tractor Shows

Scranton, Pa.	Truck & Tractor Show	March 14-17

Conventions

Salt Lake City	Intermountain Automotive Trades Assn.	Feb. 24-25

Races

Indianapolis Sp'wy.	500 Mile Race	May 30
Uniontown Sp'wy.		June 18
Strasbourg	French Grand Prix	July 23
Uniontown Sp'wy.	Annual Autumn Classic	Sept. 5

A Possible Source of Income for the Dealer in a Small Town

HOW a small town public garage can add to its income and also help to solve the problem of fire protection, always perplexing in the average village or even cities of 3,000 to 5,000 population, is illustrated at Sycamore, Ill., where the city fathers and the Butzow brothers formed an agreement which is working out successfully. Sycamore boasts of 4,500 inhabitants but has never maintained modern fire fighting apparatus until the present time. The city now owns an up-to-date, motor driven, combination pump, hose reel and ladder truck, capable of handling the ordinary small town fire. It is manned by four well-trained men, all mechanics in the employ of the garage. They are ready to respond to any alarm, either night or day. The garage is open at all times and either the day or night shift is ready to respond to any call.

The city has installed a fire alarm annunciator with a huge gong, a telephone especially to handle fire alarms, no other use being permitted, and furnishes the truck. The Butzow brothers charge the city $150 a month for the storage of the truck, the maintenance, inspection and all upkeep and also furnish the crew to fight fires. Daily tests of the starter are required and also a daily inspection. The city furnishes all needed parts. The Butzow brothers pay for any damage that may be done in operating the truck if there is negligence upon the part of any employee. The city is well satisfied with the results.

The employees are paid extra whenever they respond to an alarm. They enjoy this feature of their work and take pride in keeping the machine in first-class condition at all times and also in the way they attack a fire. They work coolly and efficiently and thanks to their efforts the fire loss is now the smallest in the history of the corporation. The aldermen are elated to know that they have such first-class protection at such a small cost, while the garage proprietor finds that the monthly check from the city comes in handy in meeting the pay roll and other obligations. What has been proved to be a success in Sycamore, will doubtless, operate equally well in other towns of 5,000 or less inhabitants and the small town garageman and the small town city fathers, might investigate the Sycamore proposition with mutual profit.

The fire apparatus in Sycamore, Ill., which is manned by employees of the Butzow Brothers' garage

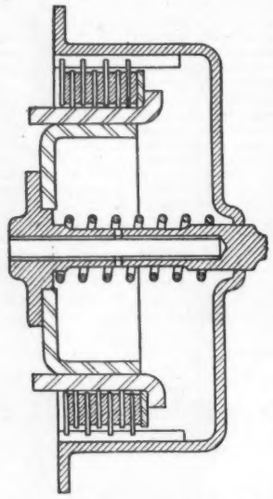
THE tire business built on the bed-rock foundation of Kelly-Springfield quality will withstand many a business storm that would demolish a business built on the shifting sands of bargain appeal.

Multiple Disc Clutches

Some Steps in Their Development to Present Day Standards of Efficiency

H. G. FARWELL, M.E.

THE use of the multiple disc clutch in Automobile work is now more or less general in cars of the heavier class and a discussion of them and the use of the friction facing with which they are equipped will probably bring out some interesting features, while investigation of the few causes of trouble may bring out some points that have escaped those whose duty it is to overcome and remedy them.



Cross Section of Typical Multiple Disc Clutch

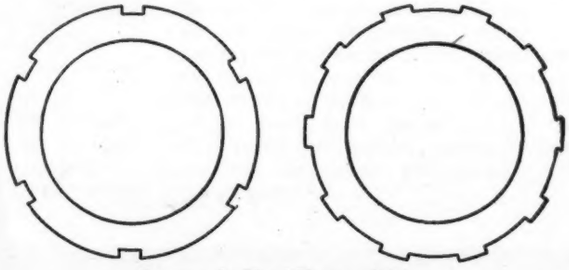
The multiple disc type in general was developed primarily in order to get the proper amount of friction surface within reasonable diameter of clutch. This was made advisable by the comparatively large amount of friction surface required in order to keep the spring pressure within workable limits, and the extremely large clutch diameter necessary to get this area on a single surface such as a cone.

This large diameter meant a large clutch and in cases where the necessary room was not available, it meant a heavy member carrying the friction facing, which being of large diameter, increased the rotative effect of the driven member to such a degree that gear shifting became difficult and troublesome. These considerations, among others, led to the use of the multiple disc clutch which, in the first instances, was composed of alternatively driving and driven steel plates. This clutch, of course, ran in a bath of oil to insure smooth engagement and to prevent the roughening of the plates under friction.

The use of an oil bath with steel plates, it was usually found, entailed the use of some means of separating the plates upon declutching in order to overcome the adhesion of the plates after the oil has been driven from between them. Otherwise, it was found extremely difficult to shift gears and often a depression of the clutch pedal only resulted in removing the spring pressure from the clutch but did disconnect the engine from the transmission as it is designed to do. Even with the addition of the releasing members an oil-immersed clutch, while very smooth in action, often does not engage as quickly as desired and sometimes in emergency this leads to disastrous results. The fact that the clutch runs in oil means that some attention is needed. When oil is necessary in the clutch casing, trouble is sure to follow if the clutch operates for any time without it.

Consideration of all these facts led to the next step in the development of multiple disc clutches, this step being the omission of the oil bath and providing one set of the clutch plates with asbestos friction facings. A further advantage was thus gained in being able to run the clutch dry and on account of the higher co-efficient of friction of the facings it was possible either to reduce the number of plates or to reduce the spring pressure. On account of the extra space taken up by the facings the reduction in the number of plates has been generally followed in order not to increase the overall dimensions of the clutch.

One of the fundamental difficulties of the multiple disc clutch lies in the large number of parts which enter into its construction, from which it follows that there must, of necessity, be a large number of places at which more or less pressure is exerted between parts that must be free to move, as shown by the keys or splines in the driving and driven shells and the corresponding keyways, or other means of transmitting the power. Due to the constant action of the clutch there is apt to become worn a slight indentation in the key and a corresponding burr on the plate. This may become in time of such depth as to seriously impair the action of the clutch, causing a dragging clutch or one that is very difficult, if not impossible, to release, due to setting of the driven edge of the plates into the worn place in the keys.

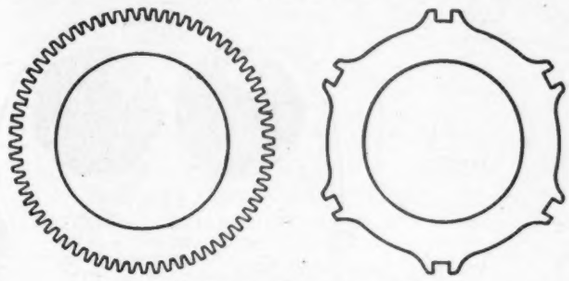


Commonly Used Types of Discs

(Advertisement)

We show in the accompanying sketches a few of the methods employed to drive the plates of several multiple disc clutches and in the larger detail sketches we show what has happened to the points of contact in several instances which have come to our attention.

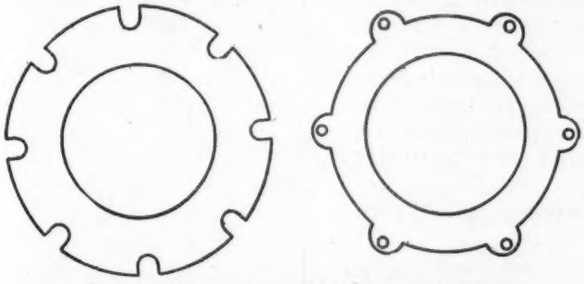
It will be noticed on the cut of the driving key how the edges of the driven plates have worn deep grooves



Variations of Driving Disc Types

in the side of the key which have prevented the proper functioning of the clutch. This is not an insolated case but is typical of the number which have come to our notice in the past.

There is another thing which happens sometimes in a multiple disc clutch which is caused by the difficulty of obtaining free longitudinal motion of the plates. We refer to the unequal wear of the facings on the different plates. It has happened in several cases under our notice that the facings on the first one or two plates at one end of an assembly have been entirely worn from the plates, remaining facings showing little if any wear.

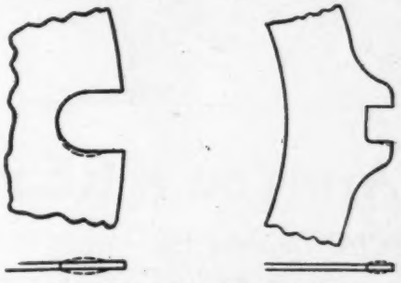


Some Further Designs That Have Been Used

It will be noticed in the cut of the cross section of the multiple disc clutch how the trouble just mentioned could occur. Suppose that the plates had cut into the driving keys to such an extent that motion of the clutch plates along the drive keys became difficult, then the complete and free release of the clutch would be impossible and for the same reason a uniform distribution of the load on the plates is impossible.

The first plate to take and transmit power is of course the one nearest the end actuated by the clutch spring, and from this plate the pressure of the spring is carried by each plate in turn to the next through the whole clutch. If now the first plate does not function properly on the keys and so does not transmit the spring pressure to the next plate this first plate is called upon to do the work of starting and driving the car which the clutch as a whole was designed to do and, being comparatively small in area, excessive wear takes place to such an extent that the facings on this plate are soon entirely destroyed while the remaining facings are virtually intact.

Practically the only cure for a clutch in this condition is to pull it down and renew driving keys and plates that show excessive wear at the bearing points. It sometimes happens that the plates or keys or possibly



Worn Keyway and Burred Plate

both are of too soft material and grooves and burrs are easily worn. In such cases a change to harder material will usually be satisfactory, while in other cases it has been found necessary to increase the bearing area, which is done by fastening a piece of steel to the plate in such a way that the key drives against the two pieces thus fastened.

Sometimes clutches are so designed that the keys can be removed and refitted so as to present new driving surfaces to the plates and often this will be found sufficient, with the corresponding smoothing up of the keyways in the plates.

It does not follow from what has been said here that the troubles mentioned are all due to faulty design or assembly of the clutch. Many clutch troubles follow from lack of care and ill use.

The troubles mentioned, however, are ones that cause a great deal of annoyance, and in examining a clutch, they are ones that should be sought.

Above all things do not re-assemble a clutch in which the key or keyways show noticeable wear, as trouble will be encountered sooner or later even though the clutch may work fairly well for the time being.

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